

PLANNING MALAYSIA

JOURNAL OF THE MALAYSIAN INSTITUTE OF PLANNERS



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Planning Asian DiverseCity, IntenseCity, ComplexCity & AuthenticCity”



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“Whoever travels in search of knowledge is on Jihād until he returns”

(Transmitted by Tirmidhi & Darimi)



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MESSAGE FROM THE PRESIDENT

Dear Readers,



As in the past, MIP is once again conceitedly to present its thirteenth volume of Planning Malaysia. Since its inauguration in 2003, the Journal has been well-received by the members as well as the academic community. This is due to the interest of knowledge seeking and improvement among the members. The articles touched on a wide spectrum of our daily planning issues. It is indeed a great achievement for the Institute as we strive to encourage more members and academics to write and share new ideas on planning and urban development.

Urban and Regional Planning is a very broad based subject that covers technical and political processes concerned with the control of the use of land and design of the urban environment, including transportation networks, to guide and ensure the orderly development of settlement and communities. The wide ranging topics in this issue reflect the various dimensions of sustainable cities and urban planning that is holistic and comprehensive. One of the key objectives of this issue is to provide a platform for town planners to share new ideas and experiences on cities and urban planning. Such new ideas are by researches, studies undertaken or actual hands-on experiences of planners. Thus, I hope this issue provides a better insight to all readers of the broad dimensions that urban or town planning has and the role of town planners play in the growth and development of the nation.

Apart from the planning circle, Planning Malaysia is also extended to various planning related organisations, institutions of higher learning as well as to all members of the institute. We anticipate to eventually extend the circulation of this journal to non-planning related organisations and institutions that has indirect role in planning within and outside the country. We hope this issue will serve the purpose and we welcome any feedback for the improvement of the forthcoming issue.

As a preside President, I would like to acknowledge and congratulate the journal's Editor-in-Chief, Professor Dato' Dr. Mansor Ibrahim and his team for the dedication and continuous support to the Institute.

Thank you and happy reading.

Md Nazri Mohd Noordin
PRESIDENT
(2015-2017)

FOREWORD



It is my esteem pleasure to present this Special Issue of Planning Malaysia based on selected papers presented in the 13th International Congress of Asian Planning Schools Association (APSA 2015) at Universiti Teknologi Malaysia (UTM) in Johor Bahru, Malaysia. UTM, the country's pioneer institution in the urban and regional planning discipline is indeed honoured to have hosted this prestigious event. The theme for APSA2015 was 'Towards an Asian Urban Agenda: Planning Asian *DiverseCity*, *IntenseCity*, *ComplexCity* and *AuthenticCity*', and oral presentation papers was featured across six tracks encompassing Urban Planning and Design Challenges; Urban Institutions and Governance; Bridging Urban Research and Urban Policy; Soul-Searching Planning Education; Green Growth and, Urban Equity and Authenticity. The theme was developed with the idea of going beyond rhetoric and planning in the Asian urban context. It is timely for the Asian urban planners to rediscover the Asian wisdom and promote an Asian renaissance in urban and regional planning.

It is gratifying to acknowledge that APSA2015 had more than 200 participants from about 20 countries in Asia and other parts of the world. Thirty distinguished research articles written by national and international scholars on variety of issues of urban context have been included in this MIP special edition. The research papers selected are experimental, computational and theoretical aspects covering the broad spectrum of planning. This special edition also includes several seminal vision articles which represent the general theme of the congress.

As Chairman of APSA 2015, I would like to express my heartfelt gratitude to the Planning Malaysia, MIP for publishing this Special Issue. My profound thankfulness is also addressed to the Organising Committee and the reviewers for their effort and commitment in ensuring that this journal are published. Finally, using the Planning Malaysia Special Edition as an occasion, I would like to thank to those who has created the opportunity for this publication particularly the UIAM as the Planning Malaysia secretariat.

Prof. Dr. Ahmad Nazri Muhamad Ludin
Chairman of the 13th International Congress of
APSA2015



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MAPPING POVERTY HOT SPOTS IN PENINSULAR MALAYSIA USING SPATIAL AUTOCORRELATION ANALYSIS

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Abstract

In September 2000 The Millennium Summit adopted the UN Millennium Declaration, committing nations to a new global partnership to reduce extreme poverty with a deadline of 2015. Eight Millennium Development Goals were formulated of which the eradication of poverty given top priority. However, Malaysia's participation with the UN in dealing with poverty, precede this when it committed itself with the United Nations Decade for the Eradication of Poverty (1997–2006) programme, which was then reinforced when the Millennium Declaration was made in 2000. Nationally, poverty eradication as well as bridging the inequality gap among the major ethnic groups and states has been the main development goal in Malaysia's development agenda since independence. In this regards, the principle of "growth with equity" has been the central theme in all Malaysia's development policies and efforts since independence. Although Malaysia has made significant achievements in reducing the incidence of aggregate poverty across the country from 8.9% in 1995 down to 1.7% in 2012, there still exist pockets of poverty in the rural areas, in certain states/regions and among ethnic groups, as well as in some urban areas. This shows that formulating planning and policy implementation to eradicate poverty now needs to be more spatially focused for the implementation to be more effective. Recognising the incidence of poverty through standard statistical data tables alone is no longer adequate in formulating planning and policy implementation. Through spatial autocorrelation analysis the pattern of distribution of poverty in space over a period of time can easily be visualised and hotspots of incidence of poverty identified. This paper attempts to show how this analysis can assist in focusing efforts to eradicate poverty in Malaysia.

Keyword: Poverty Distribution, Spatial Analysis, Malaysia

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INTRODUCTION

Malaysia was a low-income, predominantly agricultural and rural economy at the time of independence in 1957. There was widespread poverty involving about half of the country's households. More than a decade later in 1970, there was not much improvement; about 43 per cent of the households were still living in poverty (UNDP, 2007). Poverty eradication is primarily the responsibility of the national governments. Every government is confronted with this problem and various actions and solutions have been suggested and implemented but none have been able to eradicate it completely. However, that did not mean that the efforts to overcome poverty were fruitless as the fight against poverty is a continuous process.

In Malaysia's case, after more than four decades, the country has been transformed from a predominantly agricultural and rural economy, into a prosperous, urban, and industrialised economy with the issue of poverty reined in. Malaysia's efforts have been driven by the philosophy of "growth with equity" which reflected the government's commitment to eradicate poverty. This commitment was emphasised when the government committed itself with the United Nations Decade for the Eradication of Poverty programme 1997–2006 (Muda, 2005). When in September 2000 The Millennium Summit adopted the UN Millennium Declaration, committing nations to a new global partnership to reduce extreme poverty with a deadline of 2015, Malaysia's commitment was further reinforced.

In recognizing the multidimensional nature of poverty, Malaysia has pursued practical and integrated approaches to effectively eradicate poverty. The approaches were manifested in the policy focuses of its development plans (Table 1), namely, the New Economic Policy (NEP) 1970-1990, the National Development Policy (NDP) 1991-2000, the National Vision Policy 2001-2010, and the latest the New Economic Model (NEM) and the National Transformation Policy (NTP) which spans the period from 2011 until 2020.

Table 1: National Development Plans and Policy Focus

Pre-NEP	New Economic Policy (NEP) OPP1	National Development Policy (NDP) OPP2	National Vision Policy (NVP) OPP3	National Transformation Policy (NTP) New Economic Model
1960–70	1971–90	1991–2000	2001–10	2011–20
First Malaysia Plan (1966–70)	Second Malaysia Plan (1971–5) Third Malaysia Plan (1976–80) Fourth Malaysia Plan (1981–5) Fifth Malaysia Plan (1986–90)	Sixth Malaysia Plan (1991–5) Seventh Malaysia Plan (1996–2000)	Eighth Malaysia Plan (2001–5) Ninth Malaysia Plan (2006–10)	Tenth Malaysia Plan (2011–15)

Source: Economic Planning Unit, Malaysia

Under the New Economic Policy (NEP), a 20-year time frame was established to reduce and eventually eradicating absolute poverty. At the same time it also aims to restructure society to equalize economic opportunity for all Malaysians by eliminating the identification of economic function with race. Under the NDP a special Development Programme for the Hardcore Poor (PPRT) was established, incorporating a package of

economic, social, housing and the provision of basic amenities. The government also recognised the important role of non-governmental organisations (NGOs) as an integral part of the overall policy framework to eradicate poverty. Under the National Vision Policy (NVP) eradicating poverty irrespective of race, restructuring of society and balanced development remained as key strategies. The NEM and the NTP then focus in uplifting the bottom 40% of Malaysian households with the aim of ensuring that every Malaysian has an equal access and opportunity to be an active participant of the economic development. Vital to this is improving accessibility to good health care, housing, better education and the promotion of capacity building which are critical in raising the income and living standards of the poor in both, rural and urban households.

Through these policy focuses, coupled with sustained economic growth, the country reportedly has successfully reduced the rate of poverty. The general poverty rate has declined from 49.3% in 1970 to 1.7% in 2012. The hardcore poverty rate has also declined from 6.9% in 1984 to 0.2% in 2012. As such, the Millennium Development Goal to halve the general poverty rate of 16.5% in 1990 by 2015 was achieved much earlier in the year 2000 (8.5%) (Zainal Azman, 2013). Ultimately the government will be hoping to eventually eradicate absolute poverty in the future.

While the national poverty rate has shown remarkable reductions there are still substantial spatial and community variations. Thus poverty in Malaysia while it is not widespread is still visible. This paper attempts to map characteristics of poverty in Peninsular Malaysia.

POVERTY IN MALAYSIA

The discussion on poverty have suffered from the issue of inclusive and exclusiveness as it evolved over the years as have been argued by many authors such as Osutongun (1975); Voelkner (1981); Misturelli and Heffernan (2010); IFAD (1998); and the World Bank (2000). Different dimensions of poverty have been defined, among them the economic, human, political, socio-cultural and protective dimensions (OECD, 2003; 2010). The economic dimension identifies poverty as insufficient income to meet certain basic needs. The human dimension focuses directly on the question of an individual's access to basic needs, such as education, health and nutrition, without making specific reference to income. The political dimension refers to the deprivation of basic political and human rights as well as limited participation in public decision-making. The socio-cultural dimension indicates social exclusion and a lack of dignity within or between communities, while the protective dimension implies vulnerability to social, economic or security-related shocks (Steiner, 2007). Thus the essence of poverty definition has moved on from focusing on material aspects and confined to physical survival to it being multi-dimensional involving a larger spectrum of aspects. The issues of nutrition, housing, clothing, education, healthcare, powerlessness, isolation, vulnerability, market participation, "voicelessness", and rights have all been incorporated into the definitions of poverty (refer Table 2).

Poverty can be seen either in "absolute" or "relative" terms, with varying underlying principles and implications for policies and programs formulation. The concept of absolute poverty was defined as a condition in which the gross monthly income of a household was insufficient to purchase certain minimum necessities of life. These necessities were taken to include a minimum food basket to maintain household members

in good nutritional health and other basic needs, viz., clothing and footwear, rent, fuel and power, transportation and communication, health-care, education and recreation. Thus it involves the setting of a 'poverty line' by estimating the minimum level at which an individual or household can subsist. Relative poverty categorises households as "poor" in comparison to those households in the neighbourhood or region whom they are part of. It is psychological in the sense that the poor are those who feel deprived of what is enjoyed by other people in society of which they consider themselves to be a part.

Table 2: Essence of poverty definitions

Period	Essence of poverty definition
1970s	Focus on material aspects - poverty viewed as the inability to fulfill the basic requirements to attain a decent life and obtain adequate nutrition, housing and clothing.
Mid 1970s	Expanded to include - a lack of education and healthcare, thus poverty was not confined to physical survival, but became a social and institutional issue
1980s	Expanded to include - notions of powerlessness, isolation and vulnerability
1990s	Modified to be recognized as multi-dimensional - inability to secure control of resources such as land, water and income generating technologies leading to exclusion from the market and therefore have no bargaining position
2000s	Further emphasis on the collective dimension of poverty - the importance of 'giving a voice' to the poor, access to social services and capability to enjoy human rights

Source: Adapted from various sources

Officially, poverty in Malaysia is measured only in absolute terms and the recommended practice by the World Bank was to use the national poverty lines where there exist (Zulkarnain and Isahaque, 2013). This practice was adopted by most countries since the 2005 Millennium Development Goal report (United Nations, 2011). In fact, Malaysia was amongst the first developing countries to define a 'national poverty line income' (PLI) which it officially formulated in 1977 (UNDP, 2007). Since the PLI was linked to the consumer price index (CPI), the PLI was periodically revised by the National Economic Action Council (NEAC) and the Economic Planning Unit (EPU) (Hendersen, et. al., 2005) in line with movements in the CPI. The resultant revisions now mean that the PLI takes into account not only the household's size and demographic composition; the household's location, and state and stratum (urban/rural), but also the CPI. In its effort to eradicate poverty Malaysia had also introduced the concept of "hard-core" poverty in 1984 to help identify and target poor households whose income is less than half of the PLI (DOS, 2010). Table 3 shows the Poverty Line Income by Region for 2012.

Table 3: Poverty Line Income by Region 2012

Region	Poverty Line Income (PLI) 2012 (RM per month)			
	Poor		Hard Core Poor	
	Household	Per kapita	Household	Per kapita
Peninsular Malaysia	830	210	520	130
Urban	840	220	510	130
Rural	790	190	530	120
Sabah and Labuan	1090	240	660	140
Urban	1080	240	630	140
Rural	1120	240	710	150
Sarawak	920	230	600	140
Urban	960	230	630	150
Rural	870	220	570	140

Source: Zainal Azman bin Abu Seman, 2013.

The incidence of absolute poverty and hard-core poverty in Malaysia has declined dramatically since 1970 and 1985 respectively. The decline can be observed for all states within the country. However, as Table 4 shows, the states that experiences incidences of poverty rates higher than the national average since the 1970s have remained the same. Sabah, Sarawak, Kelantan, Perlis, Kedah and Terengganu still recorded higher incidences of poverty than the national average.

Since the hard-core poverty group was introduced, the incidence of hard-core poverty has also declined. In 1985, six states were recorded to have rates higher than the national average. However, by 2012 only the states of Sabah, Sarawak, Kelantan, and Perlis have rates higher than the national average (Table 5). Of these only Sabah recorded a rate of more than one percent.

Discussions on incidence of poverty have also touch on ethnic groups. Although the incidences of poverty have declined tremendously since 1970 to 2012 for each ethnic group, poverty among the Bumiputera and Indian are still prevalent. Poverty among the Bumiputera is approximately seven times higher than the Chinese. While for the Indian they are six times higher. This shows the need for programmes to be targeted to these groups in order to eradicate poverty.

DATA AND METHODS

Data

The GIS data set for this study is utilized from secondary data which are poverty data by *e-Kasih* database from the Ministry of Women, Family and Community Development and 2010 census data from the Department of Statistic, Malaysia. The case study is in Peninsular Malaysia and the database is using *mukim* boundary. *Mukim* is a local administrative boundary akin to sub-district. Table 7 shows the population of each state in Peninsular Malaysia and the number of *mukims* per state from the year 2010 census. In

total, there are 833 *mukims* with a total population of 21,406,803 people in Peninsular Malaysia. The poverty data include data on education level, gender, employment status and age groups.

Table 4: Incidence of Poverty in Malaysia by state from 1970-2012 (%)

State	1970	1976	1985	1990	1997	1999	2002	2004	2007	2009	2012
Johor	45.7	29.0	12.2	9.8	1.6	2.5	1.8	2.0	1.5	1.3	0.9
Kedah	63.2	61.6	36.6	29.9	11.5	13.5	10.7	7.0	3.1	5.3	1.7
Kelantan	76.1	67.1	39.2	29.6	19.2	18.5	12.4	10.6	7.2	4.8	2.7
Melaka	44.9	32.4	15.8	12.4	3.5	5.7	2.7	1.8	1.8	0.5	0.1
N. Sembilan	44.8	33.0	13.0	9.1	4.7	2.5	2.2	1.4	1.3	0.7	0.5
Pahang	43.2	38.9	15.7	10.0	4.4	5.5	3.8	4.0	1.7	2.1	1.3
Perak	48.6	43.0	20.3	19.2	4.5	9.5	7.9	4.9	3.4	3.5	1.5
Perlis	73.9	59.8	33.7	17.4	10.7	13.3	10.1	6.3	7.0	6.0	1.9
Pulau Pinang	43.7	32.4	13.4	8.7	1.7	2.7	1.4	0.3	1.4	1.2	0.6
Selangor	29.2	22.9	8.6	7.6	1.3	2.0	1.1	1.0	0.7	0.7	0.4
Terengganu	68.9	60.3	28.9	31.3	17.3	14.9	10.7	15.4	6.5	4.0	1.7
Sabah	-	58.3	33.1	34.3	16.5	20.1	16.0	24.2	16.4	19.7	7.8
Sarawak	-	56.5	31.9	21.0	7.3	6.7	5.8	7.5	4.2	5.3	2.4
W.P.KL	-	9.0	4.9	3.7	0.1	2.3	0.5	1.5	1.5	0.7	0.8
W.P Labuan	-	-	-	-	-	-	-	2.7	4.2	3.8	-
Malaysia	49.3	-	20.7	16.5	6.1	7.5	5.1	5.7	3.6	3.8	1.7

Source: Economic Planning Unit, Malaysia, 2014.

Table 5: Hard Core Poverty in Malaysia by state from 1985-2012 (%)

State	1985	1999	2012
Johor	3.1	0.3	0.1
Kedah	13.5	3.0	0.1
Kelantan	15.5	6.1	0.3
Melaka	5.5	1.0	-
N. Sembilan	3.7	0.4	0.1
Pahang	5.4	1.2	0.2
Perak	6.7	1.2	0.2
Perlis	11.7	1.6	0.5
Pulau Pinang	4.1	0.1	0.0
Selangor	2.5	0.2	0.0
Terengganu	11.6	5.1	0.2
Sabah	9.7	7.1	1.6
Sarawak	10.0	3.0	0.3
W.P.KL	-	-	0.1
W.P Labuan	-	-	-
Malaysia	6.9	1.9	0.2

Source: Economic Planning Unit, Malaysia, 2014.

Table 6: Incidence of Poverty in Malaysia by Ethnicity from 1970-2012 (%)

Ethnic	1970	1976	1985	1990	1997	1999	2002	2004	2007	2009	2012
Bumiputra	64.8	46.4	28.7	23.0	9.0	12.3	9.0	8.3	5.1	5.3	2.2
Chinese	26.0	17.4	7.8	5.4	1.1	1.2	1.0	0.6	0.6	0.6	0.3
Indian	39.2	27.3	10.1	7.6	1.3	3.4	2.7	2.9	2.5	2.5	1.8
Others	44.8	33.8	18.8	22.8	13.0	25.5	8.5	6.9	9.8	6.7	1.5

Source: Economic Planning Unit, Malaysia, 2014.

Table 7: Population Data for Peninsular Malaysia

State	Number of Mukims	Total Population	Citizen	Non-Citizen	Male	Female	Household Number Of	Area Sq Km
Johor	93	3182290	2905079	253811	1667849	1491041	764271	19076.93
Kedah	127	1974325	1878064	69561	985724	961901	460677	9467.52
Kelantan	66	874070	263766	4204	132202	135768	179822	15026.01
Melaka	82	785920	749115	33205	393872	388448	189670	1654.15
Negeri Sembilan	63	1051181	992455	57526	544698	505283	251030	6653.14
Pahang	71	1448777	1377853	70924	764256	684521	315310	35923.08
Perak	82	2270318	2181081	68237	1135903	1113415	560763	20965.90
Perlis	22	225630	220110	5520	111199	114431	53009	814.29
Pulau Pinang	83	1650509	1554269	96240	827714	822795	419231	1043.55
Selangor	54	5283804	4874244	406660	2734294	2546610	1324802	7957.81
Terengganu	81	1002868	975066	17102	504922	487246	209711	12948.17
Federal Territory	9	1657111	1506943	150168	840564	816547	438698	285.91
Total	833	21406803	19478045	1233158	10643197	10068006	5166994	131816.44

Source: Census 2010, Department of Statistics, Malaysia.

Standardized Poverty Rate (SPR)

The data are concerned with the total number of households and poor households in every *mukim*. Comparing absolute number of poor households may not show the true difference between *mukims* as the *mukims* vary in terms of their total households. Normalization measure called Standardized Poverty Rate was applied in order to compare the *mukims* differences. The rate needed to be standardized and must be reliable for applying advanced analysis. The formula is shown in equation (1) and (2):

$$SPR = \frac{PHHi}{Ei} \quad (1)$$

$$Ei = \frac{\sum PHHi}{\sum Pi} \times Pi \quad (2)$$

Where: SPR: Standardized Poverty Rate
 PHH: Number of Poor Household in every *mukim*
 Pi: Number of household living in every *mukim*
 Ei: Predicted Poverty Rate for each *mukim*

GIS Application for Poverty Mapping

The software used for GIS analysis was ArcGIS 10.0 with the ArcGIS Spatial Analyst and Spatial Statistic extension from the Environmental Research Institute (ESRI). ArcGIS software enabled to analyse the data based on location and lead to hot spot analysis (Getis-Ord G_i^*). A zone of Indifference was chosen as a method of analysis which depends on distance. The result of the analysis will show exactly which areas are highly poverty concentrated (Hot Spot) and which areas are having the least problems.

One of the main objectives of this research is to get the spatial autocorrelation of poverty rate of each *mukim*. These autocorrelation can be in different ways as they can be concentrated or clustered in a specific location or they can be a part of spatial outliers. Table 8 shows the classification of different types of poverty for *mukims*. For the analysis, Z score will be derived from Spatial Autocorrelations (Moran's I) tools in ArcGIS. As results, Spatial Autocorrelation will give a Z score for each *mukim* with different distances which will be used as distance band.

Table 8: Moran's I Z-Score and SPR classifications

Category	Standardized Poverty Rate	Local Moran's Z Score
High poverty (concentrated)	>2SDs above mean	≥ 2.0
Poverty (concentrated)	Between 1 and 2SDs above mean	≥ 2.0
High poverty (spatial outlier)	>2SDs above mean	≤ -2.0
Poverty (spatial outlier)	Between 1 and 2SDs above mean	≤ -2.0
Very low poverty (concentrated)	>2 SDs below mean	≥ 2.0
Low poverty (concentrated)	Between 2 and 1 SDs below mean	≥ 2.0
Very low poverty (spatial outlier)	>2 SDs below mean	≤ -2.0
Low poverty (spatial outlier)	Between 2 and 1 SDs below mean	≤ -2.0
Other	Within 1 SD of mean	-2.0 to 2.0

RESULTS ON SPATIAL DISTRIBUTION OF POOR POPULATION IN PENINSULAR MALAYSIA

This section presents the spatial dimension of poverty. Different maps are presented in different categories. The first few maps discuss on the distribution of poor households in Peninsular Malaysia and the locations of extreme poverty before showing the hot and cold spots of poverty. This is followed by a collection of maps depicting the distribution of poor household heads (PHH) according to various characteristics including gender, age group, employment and educational level.

Poverty Across the Peninsular

Poverty is concentrated in several *mukims* in Peninsular Malaysia (Figure 1). Areas with highest poverty concentration are northeast Kelantan and Hulu Terengganu. These areas have several mukims with more than 15 poor HH per 1000 population. Second serious areas are northeast Kedah and northwest Selangor and also several mukims in central Perak. Mukims southward from Klang valley have low incidence of poverty except for very few mukims in Negeri Sembilan and Melaka and a few in Johor. On average their

rates are less than 3 poor HH per 1000 population which is far lower than the national average of 220 HH per 1000 population.

Poverty Hot Spots

The three prominent poverty hot spots are: 1) Northern Kelantan together with northern Terengganu bordering Kelantan; 2) Middle Terengganu plus Hulu Terengganu; 3) Northeastern Kedah. Cold spots are around the urban capitals of Kedah, Pulau Pinang, Selangor/Wilayah Persekutuan and Melaka. See Figure 2 below.

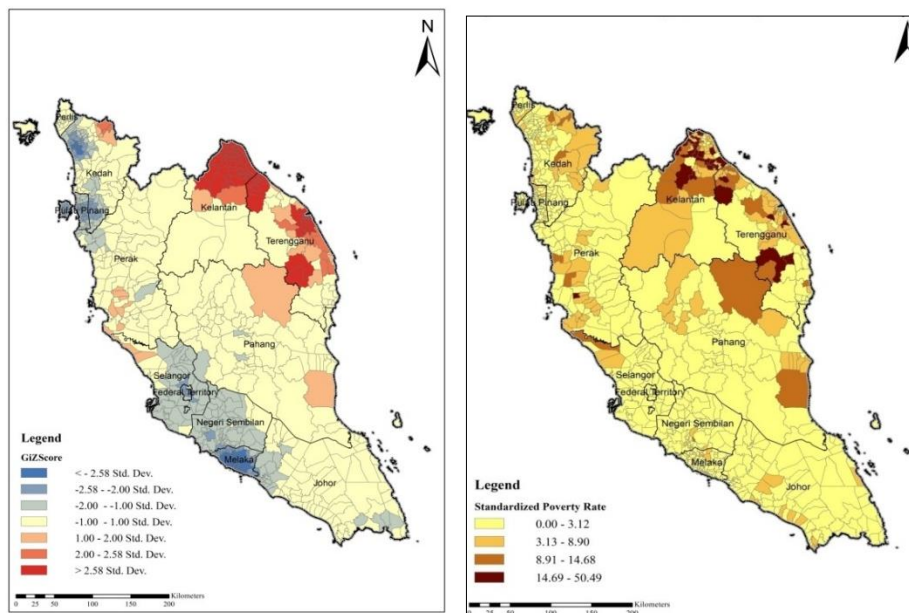


Figure 1: Standardized poverty rates by *mukim* in Peninsular Malaysia
 Figure 2: Hot and cold *mukims* of poverty in Peninsular Malaysia

Extreme Poverty Areas

High poverty ($>2SD$) are concentrated in northern Kelantan and Hulu Terengganu. These mukim are surrounded by poor mukims with ($1 < SD < 2$). Pulau Aman And Pulau Gudung in Pulau Pinang are very poor mukims that are a spatial outliers.

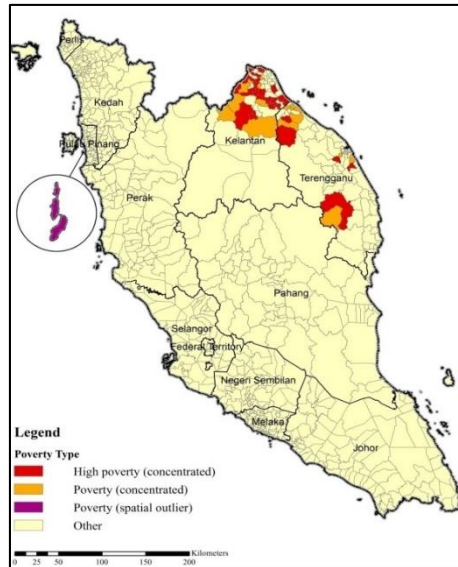


Figure 3: Areas of extreme poverty in Peninsular Malaysia

Gender of Head of Poor Households

Poor households headed by males are dominant in eastern states of Kelantan & Terengganu and Northern states of Perak, Kedah and Penang. Interestingly, poor households headed by females are more dominant in the south especially in and around the state of Negeri Sembilan where matrilineal *adat pepatih* custom is widely practiced by the Minangkabau household. Blank (white) *mukims* mean no data was available for the mukim during research. Figure 4 below highlights the distribution of the poor households based on gender of household heads.

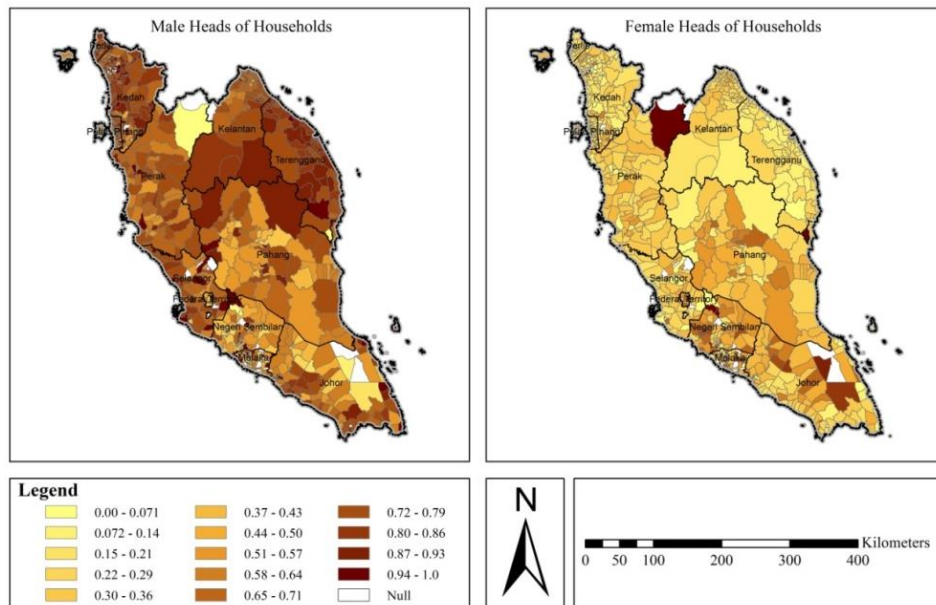


Figure 4: Distribution of poor households according to gender of household heads

Age Range of Head of Poor Households

Majority of the heads of the poor households are aged 40-59 years old. This conforms to many studies in developing countries. This is the period when most people are active in life; most people are married and working between age 40 - 59 with children attending school and not contributing into the family coffers for the upkeep of the family. Fewer households had their head's aged 18-39. This is because at this age most people are still schooling or learning a vocation and therefore cannot assume headship of the family. Most people at age 18-39 are still dependent on the active working force within age 40-59. There were some head of household aged 60yrs and above. Most of the heads 60yrs and above had kids that were grown up and were therefore not leaving within the household. Most of them were supporting their aged parents who are 60yrs and above. See Figure 5 below further elaboration.

Employment of Heads of Poor Households

Most heads of poor households are either self-employed, wage earners or unemployed. Interestingly however most heads who are self employed or wage earners are in the very north and northeast states of Kedah, Kelantan and Terengganu. The heads of poor households in these rural areas are simply not making enough money on their own (self-employed) or not getting paid enough wages (wage earners) for their labour. While those heads of poor households who hold no jobs are mostly in the urban areas of Klang Valley and Malacca. Figure 6 depicts these phenomena.

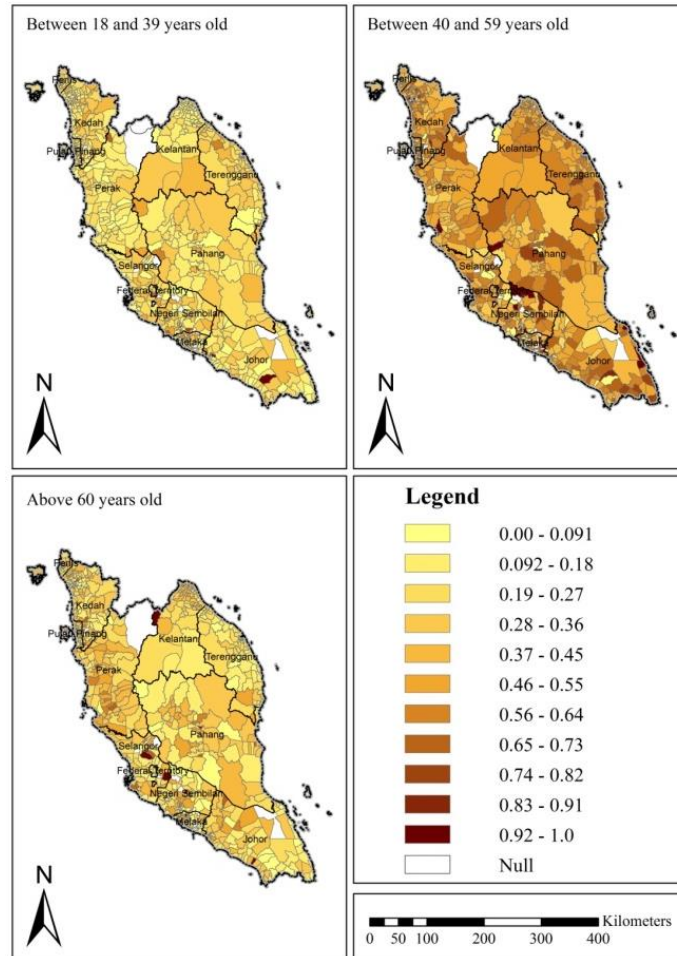


Figure 5: Distribution of poor households according to age of household heads

Education of Heads of Poor Households

Education indeed plays a major role in poverty levels. Majority of the poor household heads had no certificate to show for their education (> 50%) as shown in Figure 7. Poorly educated heads of households are more likely to be poor. Most of the poor head of household are with no certificate at all or at the most finished only primary school (UPSR certificate). Those with at least a diploma are very unlikely to be poor and poor heads of households with at least SPM-level qualification are more concentrated in the urban area.

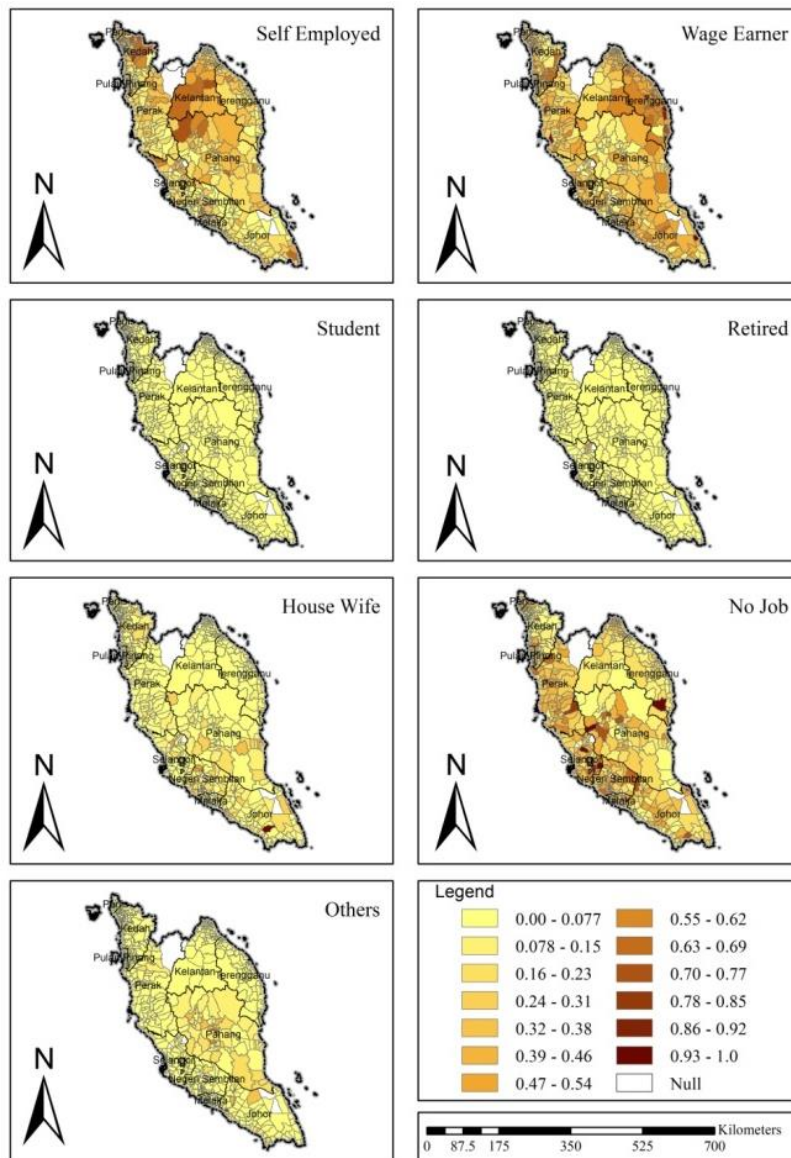


Figure 6: Distribution of poor households according to employment of household heads

CONCLUSION

The main development goal in Malaysia's development agenda since independent has been poverty eradication as well as bridging the inequality gap among the major ethnic groups and states. The principle of "growth with equity" has been the central theme in all Malaysians' development policies and efforts since independence. Malaysia has consistently formulated a number of policies and plans to guide the management of national development and poverty reduction since independence.

Areas with highest poverty concentration are northeast Kelantan and Hulu Terengganu. These areas have several *mukims* with more than 15 poor households per 1000 population. Second serious areas are northeast Kedah and northwest Selangor and also several *mukims* in central Perak. The three prominent poverty hot spots are: 1) Northern Kelantan together with northern Terengganu bordering Kelantan; 2) Middle Terengganu plus Hulu Terengganu; 3) Northeastern Kedah. Extreme areas with high poverty concentration of more than two standard deviations are concentrated in northern Kelantan and Hulu Terengganu. These *mukims* are surrounded by poor *mukims* ($1 < SD < 2$) except for Pulau Aman and Pulau Gudung in Pulau Pinang which are outlier very poor *mukims* surrounded by relatively rich *mukims*.

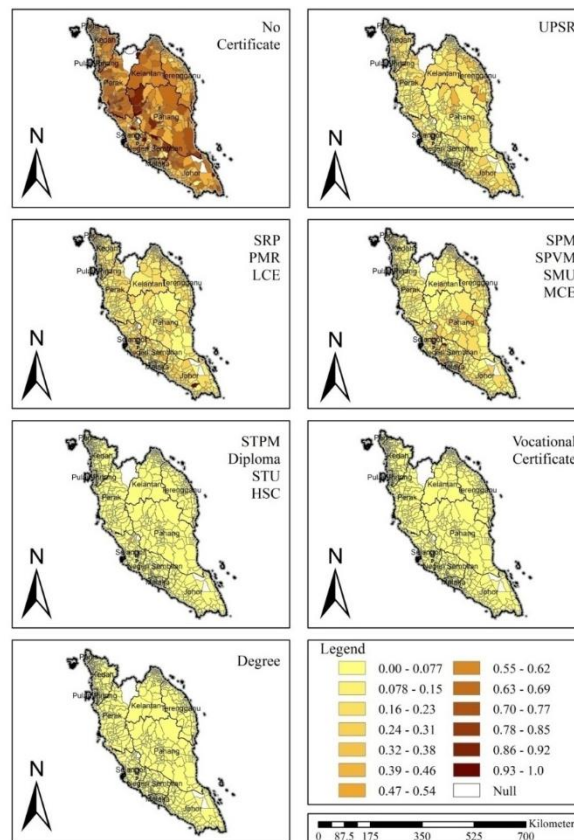


Figure 7: Distribution of poor households according to education of household heads

The analysis also revealed that poor households headed by males are dominant in eastern states of Kelantan and Terengganu and Northern states of Perak, Kedah and Penang. Poor households headed by females are more dominant in the south especially in and around the state of Negeri Sembilan where the matrilineal *adat pepatih* custom is widely practiced by the Minangkabau household. Majority of poor household heads are aged 40-59 years old. Most heads of poor households are either self-employed, wage earners or unemployed, especially in northeast Kedah, Kelantan & Terengganu.

The study has shown and highlighted the pattern of distribution of poverty in space which is helpful in planning and informing policy formulation to eradicate poverty in peninsular Malaysia. Inequality between states, regions and mukims still remain wide and persistent. In order to achieve the objective of ensuring that the benefits of economic growth are shared equitably among all Malaysians, it is imperative to intensify the poverty reduction efforts in the regions and mukims showing extreme poverty in order to sustain economic growth as well as for the maintenance of social stability and national unity. Government should concentrate its poverty reduction efforts in areas with highest poverty concentration such as northeast Kelantan and Hulu Terengganu, Northeast Kedah and Northwest Selangor and central Perak. In order to achieve the objective of ensuring that the benefits of economic growth are shared equitably among all Malaysians it is imperative to intensify the poverty reduction efforts in the regions showing extreme poverty in order to sustain economic growth as well as for the maintenance of social stability and national unity.

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MANAGING URBANISATION AND URBAN SPRAWL IN MALAYSIA BY USING REMOTE SENSING AND GIS APPLICATIONS

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Abstract

In the global era, more than half of the world population live in urban area. With rapid urbanisation growth where the highest percentage concentrates in Asia, a relevant approach is needed to eliminate the possible threat that occurs after urbanisation took place; the urban sprawl. Urban sprawl is a popular term in academic discourse and has a long history but until these days, the concrete definition of this term is not yet configured. Many studies of sprawl have rooted back in non-Asian countries making the solution for sprawl is not suitable to be implemented in term of theories and practice. This research attempts to study the measurement of sprawl by using these geospatial indexes with Remote Sensing and GIS approach. The SPOT-5 images with 2.5 meters resolution were used to analyse the growth of sprawl in Kuala Lumpur metropolitan due to its high urbanisation rate. The findings show that Kuala Lumpur is a sprawling city. It is anticipated that this research will provide a new direction in urban sprawl studies and represent a robust analytic approach for characterizing urban development on the city scale at once as well as promoting a city via Remote Sensing and GIS technology.

Keyword: Urban Sprawl Measurement; Geospatial Indices; Urbanisation; Remote Sensing; GIS; Asian Cities

INTRODUCTION

Urbanisation can be defined as the physical growth of urban areas as a result of global change when people move into the city from the rural area. Urbanisation is closely linked with modernisation, industrialisation, and the sociological process of rationalisation. According to Bhatta et al. (2010), urbanisation is a process of population concentration; the shift from a rural to an urban society, and involve an increase in the number of people in urban areas during a particular year. Economic and social development cause urban concentration and expansion of large cities using changes in land use pattern as well as the transformation of organisation and governance from rural to metropolitan.

Bhatta et al. (2010) have made a clear statement to distinguish between *Urban Growth* and *Urbanisation*, which both are claimed as the main process of urban development. Urban development is a process where an area is growing due to the increasing demand in cities and urban value. Urban growth were referred as a spatial and demographic process that denotes the significance of towns and cities as a concentration

of population within a particular economy and society while Urbanisation is a spatial and social process that refers to the changes of behaviour and social relationships that occur in social dimensions as a result of people living in towns and cities.

Jaafar (2004) has stated that urbanisation or growth of urban areas are phenomena that increase the concern of policy makers and town planners since the trend of urbanisation have wide-ranging implications for socio-economic development. Traditionally, urbanisation has a strong connection with industrialisation process. The development of industrial activities usually focused in the urban area due to the availability of infrastructure and facilities; this scenario created more job opportunities that cause many people chose to migrate to the urban area. The high number of the population requires more source of energy to be provided in order to enhance human productivity that leads increasing demand for both industry and agriculture. This situation will cause the rapid and massive growth of migration to large cities. Urbanisation can result in positive and negative consequences. In most urbanised countries, some of the issues are employment, sanitation, housing, sewage, water, fire, social welfare, the role of government, and political machines.

Due to urbanisation, the housing and infrastructure cost also increase due to the scarcity of resources such as land area, water and building materials. Moreover, the major environmental impact of large cities often includes traffic congestions and noise pollution. Urbanisation process causes the city to decay which the local authority cannot provide service that meet the need of the residents. Air pollution resulted from over-dependence on motorised transport, and water pollution resulted from poor sewage facilities. Based on the different views and opinion on the Urban development, Urban Growth and Urbanisation, it can be concluded that these process will affect three main aspects which are (1) Physical, (2) Demographic and (3) Social factors in an area which all of this aspect closely linked to urban sprawl.

Urban sprawl is a stage that takes place after urbanisation. Cities grow vertically and achieve certain density tend to continue to grow horizontally, spilling out from its border and infecting the outside area around the original town. It is one of the low-density developments which mean it occupies the lot of space that functioned as natural habitat, vacant land or even farmland. Urban sprawl and its impacts have attracted increasing attention from planners and policy makers resulting in heated discussions on its definition, measurement, causes and negative consequences. A selection of urban sprawl definitions has been derived to describe sprawl and as a particular form of urban development with low density, disperse, auto-dependent, environmentally and socially-impacting characteristic (Burchell and Shad 1998; Ewing 2002; Galster et al 2001; Majid et al 2010). Urban sprawl is a process that is characterized by an unforeseen and jagged pattern of growth, driven by a multitude of processes and leading to inefficient resource utilisation (Bhatta et al. 2010). Uncontrolled, unplanned and uncoordinated growth of urban areas causes the urban sprawl to occur. Urban sprawl which is both inefficient and unsustainable is due to the inability of town planners, policy makers and the authority to visualize such growth during planning, policies and decision-making process.

The methods to measure urban sprawl have been a hot issue for research. Many scholars tend to focus on using indicators to measure urban sprawl by establishing multi-dimensional indicators by GIS analysis or descriptive statistical analysis (Galster et al., 2001). Sprawl can be measured in relative and absolute scales (Bhatta et al., 2010).

Absolute measurements are capable of creating a black and white distinction between a sprawled city and compact city. GIS and remote sensing can be combined or used separately in studying urban sprawl, both applications can supply physical, social and economic data for simulation Mohd Noor et al. (2009). There are some researchers on how to use remote sensing and GIS to monitor and measure urban sprawl (Sudhira & Ramachandra, 2007; Weng, 2001; Yeh & Li, 1999). Remote sensing has the capability to provide spatially consistent datasets that cover vast areas with both high spatial detail and high temporal frequency. It has been in use since 1960; remote sensing can also provide consistent historical time series data. Remote sensing is a “unique view” of the spatial and temporal dynamics of the processes of urban growth and land use change (Herold, Menz, & Clarke, 2001). Satellite remote sensing techniques have, therefore, been widely used in detecting and monitoring land cover change at various scales with a useful result (Wilson et al. 2003). Recently, remote sensing has been used in combination with Geographical Information System (GIS) and Global Positioning System (GPS) to assess land cover change more effectively than remote sensing data alone (Weng, 2001). The combination of GIS and remote sensing are useful in mapping urban areas, and as data source for the analysis and modelling urban growth, and land use/land cover change (Herold, Goldstein, & Clarke, 2003; Wilson et al., 2003).

According to Majid (2011), as different types of sprawl are caused by various factors, different approaches are required to address them. Advocating for more compact development in order to address sprawl phenomenon in Malaysian cities, for example, may not necessarily work without first knowing the type of sprawl the cities are facing. Many approaches have been used to quantify the sprawl, and one of the methods has been suggested by Heargreaves (2014) in his article which concludes main components in calculating a sprawl was the density of houses and jobs. Ewing et al. (2014) have stated that there have been numerous applications of the original sprawl index. The original sprawl index was made available to researchers who wished to explore the various costs and benefits of sprawl. The county sprawl index operationalized only two dimensions of urban form residential density and street accessibility. These measures are modelled after a complete metropolitan sprawl indices developed by Ewing et al. (2002). The refined indices operationalize four dimensions, thereby characterizing county sprawl in all its complexity. The four are development density, land use mix, population and employment cantering, and street accessibility. In this paper, the best way to measure urban sprawl is by using five of the land use pattern spatial factors. The spatial factors include Leapfrog Development, Discontinuous Development, Segregated Land-Use Development, Planning Consistency Index, and Urban Density Development. The calculation was carried out based on GIS and remote sensing application, and the results of the analysis were visualized as maps. Based on the calculated results, the researchers were able to identify an empirical metric for distinguishing between urban sprawl from non-sprawl urban development.

OBJECTIVE

The research was conducted to measure urban sprawl development in Kuala Lumpur city by applying the geospatial indicators developed in the western countries in the local geographical development background. It is to investigate as well the relationship and influence of urbanisation process and urban sprawl. The process involved literature review on the urban growth, urbanisation and urban sprawl, the issues and problems as well as the impact. This research is the pioneer to further develop a geospatial measure that suite the local background and at the same time contribute to the knowledge and defining sprawl.

STUDY AREA

In 2010, the Asia-Pacific region's urban population were 754 million people which is more than the population of the United States of America combined with the European Union. The urbanisation rate in South East Asia has been increased over the years and expected to achieve 50million people in 2020 as compared to only 30 million people in 1990. However, urbanisation growth in Asia is regarded as environmentally unsustainable with the growth of slums in overpopulated urban areas, a high level of social and economic inequality (ESCAP 2010). Urbanisation in Malaysia can be classified into three major period starting with the founding of urban areas during colonisation period in the 1800s, followed by urban growth, development and increasing urbanisation in the early years of independence (1950s). The urbanisation rate in Malaysia is increasing year by year from about 25% in 1960 to 65% in 2005. Malaysia target to achieve 70% urbanisation rate in the year 2020 which means 70% of its total population are living in the urban area.

The majority of the urban population enjoy a high standard of living with good access to clean water and sanitation facilities. The Tenth Malaysia Plan focuses on developing infrastructure to improve productivity and making the private sector as the engine of development. The plan identifies 12 National Key Economic Area, which Kuala Lumpur, the largest urban centre in Malaysia is one of it. Kuala Lumpur Metropolitan (3°8'51"N 101°41'36"E), which covers an administrative area spread over 24,221.05 hectares (figure 1). Majority of the land use patterns consist of built-up areas (residential, industrial, commercial, institution, recreation area, road, infrastructure, and utilities) and unbuilt areas (agriculture, forest, bare land, and water bodies). The population of Kuala Lumpur was 1,600,000 in 2012 (Kuala Lumpur Local Plan, 2010-2015). To achieve better future urban development and infrastructure planning, it is crucial for the Kuala Lumpur City Hall to recognize sprawl phenomenon happening in Kuala Lumpur including on how to measure and determine urban sprawl factors and patterns in order to control its growth.

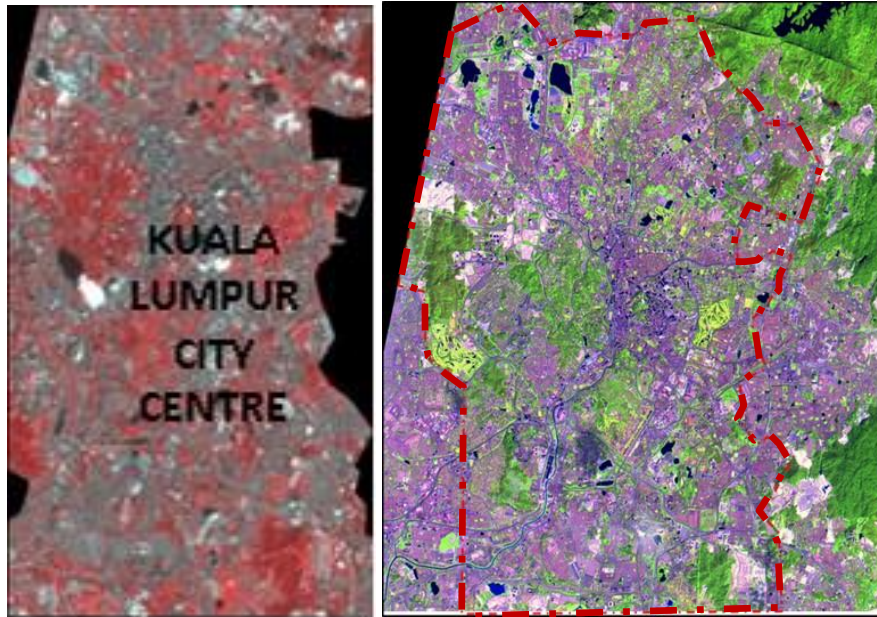


Figure 1: Location of study area – Kuala Lumpur District, Malaysia

SOFTWARE AND MATERIALS

Extensive availability of remote sensing images, spatial data and geospatial tools has seen some surge in the intensity of urban sprawl studies. A typical urban sprawl study involves an attempt at quantifying the amount of paved surface and built up area in a given region using remotely sensed data or other geospatial data. The coverage of these paved and built up areas will then be used to identify the pattern and extent of urban sprawl. In other words, urban sprawl mapping can help in picturing how and where the growth of a city is occurring. These situations allow the responsible authority to recognize types of development that can be executed or need to be avoided in the particular area. Moreover, threatened natural and environmental resources can be identified and preserve which likely support future development that is not only sustainable but also help to reduce urban sprawl. By analysing the urban sprawl growth pattern in an area over a period, its nature and characteristic can be indulged and managed by the responsible authority primarily the local planning authority.

Moreover, Yeh and Xia (1999) have stated that GIS and remote sensing are very useful tools especially in the formulation and implementation of temporal and spatial changes. The changes in spatial and temporal development are an essential component in planning practice particularly for monitoring purposes in order to ensure sustainable development. The different stages in the elaboration and implementation of a regional development strategy can be generalized to determination of objectives, resource inventory, analysis of the existing situation, modeling and projection, development of planning options, selection of planning options, plan implementation, and plan evaluation, monitoring and feedback (Yeh and Xia, 1999). GIS and remote sensing techniques are quite developed and operational to implement such a proposed strategy.

These applications are now also providing new tools for advanced ecosystem management. The collection of remotely sensed data facilitates the synoptic analysis of earth's system function patterning and change at local, regional and global scales.

According to Agarwal (2007), the real world cannot solely be represented in two dimensions as is commonly accepted. Most modelling in GIS has been two dimensional especially in the context of urban planning. The development in the field of "fuzzy logic" and "artificial neural networks" is providing the option of incorporating indeterminate and ambiguous information from the real world into GIS. This will be especially helpful while considering the cognitive models and individual perception of people and incorporating them by reference into GIS. For this study, the primary research mainly depended on the data obtained from MACRES, Department of Survey and Mapping Malaysia (JUPEM), and the local authority (Kuala Lumpur City Council). The satellite data were the primary sources while the ancillary data were the secondary data (Table 1). The satellite data included SPOT-5 images from 2012. On the other hand, the ancillary data consisted of topographic maps, land use maps, road map, contour line, and urban map. The software used to calculate and analyse the raw data and to generate the results included ERDAS, ArcGIS, MapInfo, E - cognition and SPSS.

Table 1: Data sources for study

Type of Data	Year of Acquisition/Publication
Spot-5 images (2.5 meter)	2012
Topographic Maps	2010
Land Use Maps	2010
Road Map	2010
Contour Line	2010
Urban Map	2010
Vector Data	2010

The spatial patterns of urban sprawl on the temporal scale are studied and analysed using the satellite imageries and cadastral data from related agencies as previously mentioned. The data then being mapped, monitored and accurately assessed from satellite data along with conventional ground data. The image processing techniques are also quite effective in identifying the urban growth pattern from the spatial and temporal data captured by the remote sensing technologies. This method will help in demarcating the pattern of urban sprawl growth in a city. In this research, the pattern of urban sprawl growth will be based on the selected land use factor of geospatial indices. Mapping urban sprawl contributes to identifying areas where environmental, and natural resources are critically threatened and to suggest likely future directions and patterns of sprawling growth. Herold et al. (2001) has support the statement by proving that the models have shown potential to help planning and management decisions by providing knowledge and understanding of the dynamics of the urban system (intuition structuring), anticipating and forecasting future changes or trends of development, describing and assessing impacts of future development, and exploration of different policies and optimisation of urban planning and management. Urban sprawl mapping and monitoring is one of the operational applications of satellite remote sensing data, irrespective of its spatial and

spectral resolution of the satellite-borne sensors. Later, the result of GIS and remote sensing usage in urban sprawl studies will be explained further in the next sections.

METHODS

The image pre-processing and data preparation were carried out; these included image rectification and mosaicking. The image-to-map procedures were applied to the Spot 5 images using set of ground control point's area that appeared in the same place, both in the imagery and known locations in corresponding map and urban plan used as ancillary information in the rectification process. The rectified datasets were then mosaicked thus producing the entire study area from Vector Data images as supported data (Figure 2). Image classification was then applied to the pre-processed image and the land use classes map of the entire study area was produced. Supervised classifications techniques were chosen for this study, which was performed using the object-based classifier in E-Cognition software system. The system enabled all fine details of the land cover to be classified and later merged accordingly to form the classes in accordance with urban land use classes used in urban planning practice. In this study, the object-based classifier was employed to build optimal training areas and to build up knowledge for each category of interest prior to the classification of the entire image. Initially, the algorithm trained the spectral classes by supervising the training process after collecting the parametric and non-parametric signatures (training samples). After completion of the training process, the entire knowledge of the class's occurrence within the SPOT-5 image was generated. The knowledge was then used to identify all the pixels in the picture into the trained classes with multi-resolution segmentation approach. The classes identified were then re-categorized into two main classes namely unbuilt and built up, apart from identifying them further into detailed of the type of 11 land uses.

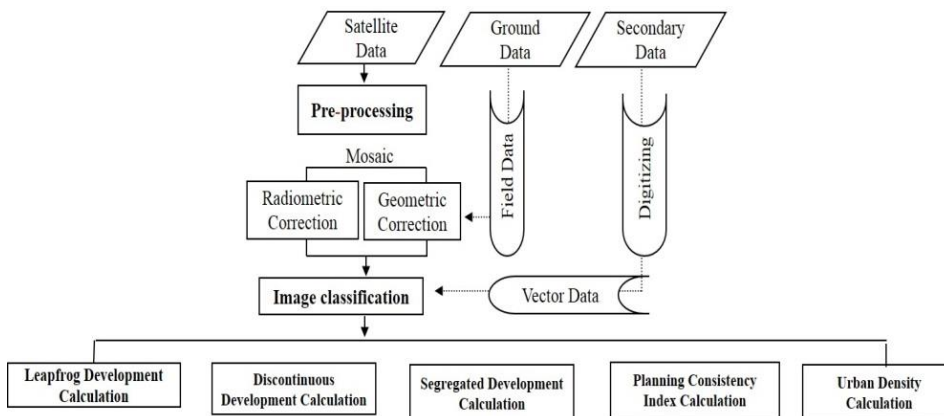


Figure 2: Flowchart of data processing adopted in the study

The sets of SPOT-5 images were successfully geometrically corrected with transformed RSO coordinate with RMSE ± 0.5 pixels to ensure the accuracy of the sprawl. In fact, this RMSE has been widely used as a good practice to ensure good geometric output apart from ensuring the sound configuration of ground control point that is evenly

distributed in the study area. Fill this imagery is also subject to image enhancement. The image classification was carried out in two steps process to produce first level classes of built and unbuilt areas and further detailed land use classes within the built-up areas. Final classified image classes are as tabulated in Table 2.

Table 2: Land use classified for year 2010

	Land Use Class	Area (ha)	Percent (%)
1.	Residential	5,489.56	22.66
2.	Commercial	1,091.71	4.51
3.	Industrial	553.05	2.28
4.	Institution	1,620.80	6.69
5.	Infrastructure And Utilities	5,029.62	20.77
6.	Open Area And Recreation	1,579.56	6.52
7.	Community Facilities	1,382.44	5.71
8.	Undeveloped land	5,756.74	23.77
9.	Squatters	570.63	2.36
10.	Utilities	1,146.94	4.73
	TOTAL	24,221.05	100

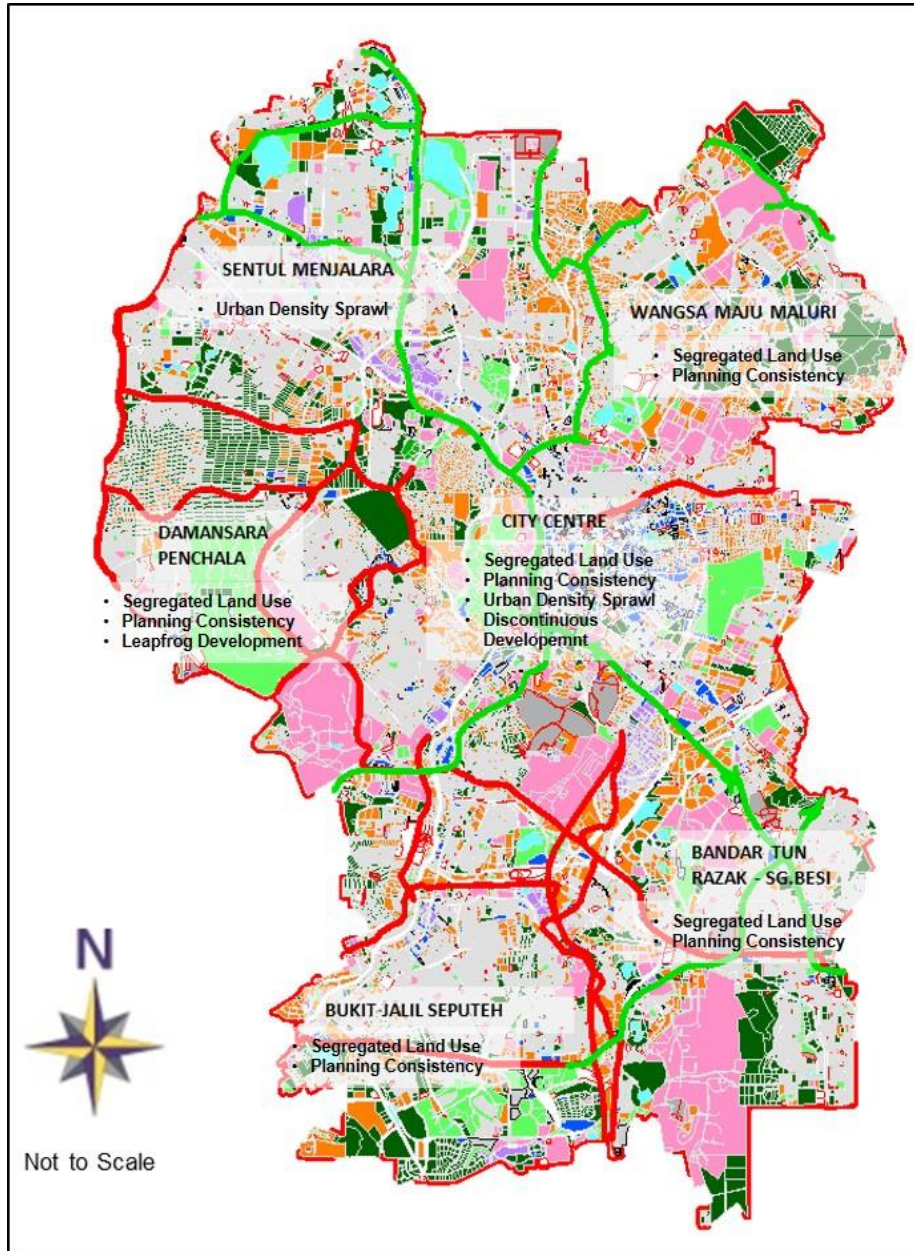


Figure 3: Types of Urban Sprawl in Kuala Lumpur District, Malaysia

Based on the geospatial indices of urban sprawl measurement that have been conducted, the results show that all areas in Kuala Lumpur are facing different types of sprawl problems (Figure 3). The city centre has the most types of sprawl which are segregated land use, urban density sprawl, planning consistency, and discontinuous development. The next city with a high number of urban sprawl types is Damansara-Penchala district which have three types of urban sprawl namely planning consistency, leapfrog development and segregated land use. However, only one type of geospatial indices urban sprawl that are occurring in Sentul Menjalara district. The remaining three district (Wangsa Maju- Maluri, Bdr. Tun Razak - Sg. Besi and Bukit Jalil- Seputeh) has two types of urban sprawl for each district. The majority of the areas in Kuala Lumpur have less than three types of land uses. This situation indicates that Kuala Lumpur is facing urban sprawl but not in the critical level. However, without proper measures to overcome the current problem, the future development of Kuala Lumpur might lead to bigger sprawl growth. The urbanisation process in Kuala Lumpur started at the City Centre due to mining activities in the 1850s. The mining town was developed organically which means that no proper city planning have been implemented along with its urbanisation process. Then the urbanisation process has spread to the neighbouring area from the city centre to Damansara – Penchala and Wangsa Maju- Maluri. People tend to move from high-density area to suburban area due to spacious residential land and low cost of residential building as compared to the city centre. Many of the workers from middle-income group choose to commute from their residential area in suburban to work in the city to save cost on housing.

However, previous studies in urban sprawl demonstrate the true costs of sprawl, and attempt to show that if new development was built at higher densities and with proper public transit, lots of money could be saved as compared to developing new land area near the urban area. The new development outside the urban area has its hidden costs, identifying innovations note that there is demand for sprawl, for the suburban home and that, even though, the infrastructure and operating costs are considerably higher, the price is often cheaper. But with new development, facilities like road network need to be built to cater the need of suburban settlers. Roads are free to use but aren't cheap to build or maintain. The cost of building roads come from the taxpayers. Plus, the provision of too many roads for private vehicles has caused traffic congestion and pollution in Kuala Lumpur.

Abdullah (2012) has stated that the trend of urban sprawl has continued unabated in major metropolitans of Malaysia especially Kuala Lumpur, whereby most of the new developments are located in the periphery. These developments have implications for socio-economic developments and cultural aspects of cities in Malaysia. His study shows that the movement of sprawl development in Kuala Lumpur is moving towards the fringe area of Kuala Lumpur, which is in line with the findings as shown in figure 3. Figure 4 summarized the findings based on three different scores according to spatial indices by using the new residential area as a point of reference. Based on the results, it can be sure that there are many areas in Kuala Lumpur is facing sprawl. Kuala Lumpur, previously was an administrative centre has change to function only for capital city and as commercial centres after the seat of government was shift to Putrajaya in 1999 in order to reduce congestion and overcrowding of Kuala Lumpur (Kuala Lumpur City Plan 2020). However, the urban sprawl phenomenon still occurs in the city where development

highly takes place. The urban sprawl that took place in Kuala Lumpur is different in each district and based on the different characteristic.

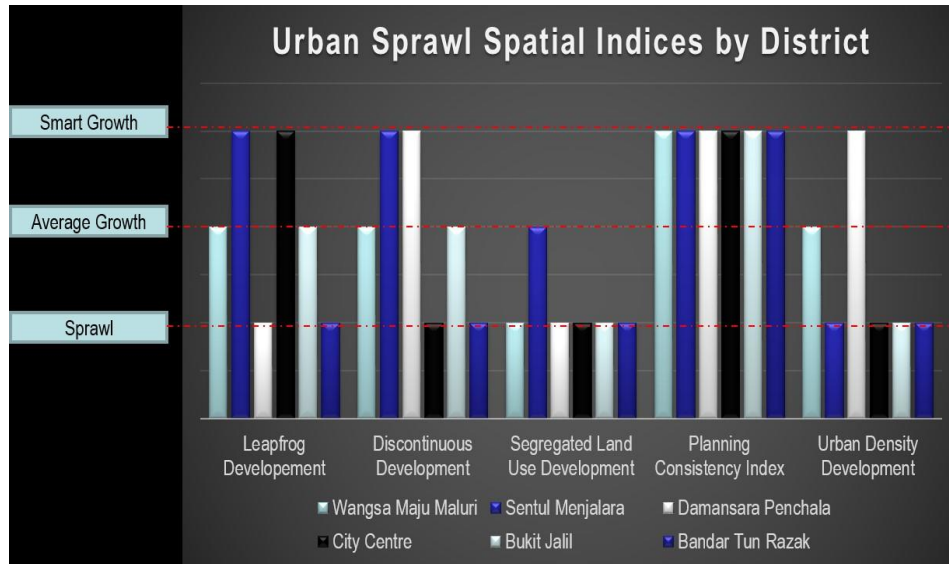


Figure 4: Urban Sprawl spatial indices by District

The finding shows the result of sprawl in various districts by using all of the land use types as its point of calculation. Figure 4 displays the result of sprawl measurement by using the residential area as the point of calculation. The residential area was chosen due to its influence on urbanisation process (demand from the population) and one of the common factors towards urban sprawl growth. Planning consistency index sprawl has the highest scores where the entire district in Kuala Lumpur scores 'smart growth'. This situation indicates that all of the residential areas that have been developed has followed the land use location and the requirement by the local authority; Kuala Lumpur City Council. At the meantime, segregated land use development and urban density development are the real sprawling problems in Kuala Lumpur. These types of sprawl occurred in the newest residential area for all district. The new residential area in Kuala Lumpur tends to be segregated and built with the low density especially residential area outside the city centre. As was previously mention, due to urbanisation factor, many choose to stay outside the city centre due to lower cost of the opportunity to have spacious living area. While for leapfrog development and discontinuous development sprawl, the score is average for all categories (each score have two districts). By looking further into these two characteristics, some suitable measures can be taken to overcome its growth in order to enhance those district that fall under average growth and sprawling.

CONCLUSION AND RECOMMENDATIONS

In contrast to the rich literature on urban sprawl in Western cities, little is known about Malaysia urban sprawl growth. This paper provides a brief assessment and analysis of types of urban sprawl that occurred along with the urbanisation Kuala Lumpur. The complex nature of land use pattern in urban sprawl requires measures to employ multiple geospatial indices. In this research, we examine the most significant indicators related to five land use spatial factors using remote sensing imagery data and GIS approach. We realize the application of technology in city management is important since cities were growing rapidly in most developing countries. However, there is other possible measures or variation to the measures employed here that hold potential for spatial analysis of urbanisation in general & urban sprawl in specific. Land use spatial patterns index provide a significant approach for identifying, comparing, and contrasting sprawl development in a more detailed manner for further investigation of the underlying process at play. As urban patterns for given region change with time, that reflected in changing sprawl index value and its technological tools may itself provide insight into the long-term patterns, underlying process, and likely consequences of spreading development compared to its smart growth analysis. Although the GIS and remote sensing application is a universal technique that being used worldwide, the geospatial indices of urban sprawl that being employed in this research are original to solve the urban sprawl problem in western cities. There will be a lot of things to be improved in the future to ensure that the geospatial indices being used to identify sprawl are suitable with urbanisation in the different geographical area as compared from its original background. It is researcher's biggest hope that the measures used in the research will be refined so in the future it will be useful for managing urban sprawl growth along with urbanisation in the cities of South East Asia.

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**FROM TRADE ROUTES TO STREETS CULTURES – AN OVERVIEW
OF THE SIGNIFICANCE AND CHARACTERISTICS OF
SOUTHEAST ASIAN TRADITIONAL STREETS**

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Abstract

The uniqueness of the Southeast Asian Traditional streets requires careful investigation in the context of its existence. In this regard, the study focuses on examining what factors contribute to the significant formation of Southeast Asian traditional streets. As early as 1500s the region became an important trading centre for the world, where the West meet the East. The emergence of ports along the coastal line and river mouth played remarkable roles, not only as places for trading goods, but also as a place that exchanged skills, languages, customs, ideology, religion through various means and aspects. Reviews from historical background indicate that ports and cities were transformed physically by virtue of the varieties of hybrid cultures that accumulated from time to time. In this respect, the accumulation of cultures tremendously affected the streets activities and its settings. Urban elements as ports, markets, commercial districts and public spaces point out several identities pertaining to the street cultures and characteristics. It was identified that the maritime trade routes during 15th-18th centuries brought abundantly changed to port cities such as Melaka, Bangkok, and Hanoi through the exposure to various influences. This paper demonstrates the correlation between physical forms and cultural entity of these cities. It reveals the linkages of the influential components from the adopted culture that merged with local context, which strongly emphasized the streets characteristics. Comparing with western commercial street models, Southeast Asian Traditional streets convey the local wisdom that inscribed how people use the streets and how streets formed by hybrid settings.

Keyword: Southeast Asian trade route, port-cities, informal activities, traditional streets, and street culture

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INTRODUCTION AND BACKGROUND OF RESEARCH

Unlike elsewhere in the world, a long and rich history of Southeast Asia played remarkable role in the establishment of cities and port cities with the showcase of trading activities – a rich international emporium where business never account to built style but merely reflective of its vibrant atmosphere. Indigenous settlement and urban life existed for a thousand years and towards the rise of the age of commerce during 15th century until the postcolonial eras, Southeast Asia exhibited in the global position as international emporiums where the congruent of mixed culture is an everyday occurrences, the land where the West eventually discovered the East.

Beyond the Southeast Asia's roles, trade routes became the interesting point to study about how cities and urban areas were developed and how cultures were formed and shaped. From the primate cities to the long extended lines of sea routes beyond the boundaries of kingdoms or empires, port cities along the coastal lines or by the river mouths developed provide excellent examples to explore in their elements and the street patterns.

AIM AND OBJECTIVES OF STUDY

The research aims to establish a linkage between the trade-based port cities, from their emergence during maritime trade routes in 15th-18th centuries and the reflections of the past that laid on the street activities and their culture. This research explores into 3 layers of studies from; a) the reviews of maritime trade routes; b) the emergence and importance of port cities; c) the streets cultures in context of human activities, the physical setting and the endemic cultures.

The research objectives in particular are directed to; a) categorize the key elements that shaped the characteristics of the urban port cities and b) illustrate the aspects of street cultures derived from case studies and the major influences that shaped the traditional streets. Case studies from Bangkok (Thailand), Hanoi (Vietnam), and Melaka (Malaysia) were selected in order to reveal the significances of Southeast Asia's street cultures. All sites selected are the representative of Southeast Asia port-cities, which shared some common aspects and features that will be discussed later.

The result will demonstrate the significant roles of trading activities that derived from the past maritime trades to the culture of the formal and informal activities on the streets today. In this regards, the streets characteristic require the careful approach in understanding how important the quintessence of the streets activities that remain in the present day.

THE LANDS BELOW THE WINDS: THE EMERGENCE OF TRADE ROUTES SINCE 15th CENTURIES

“...human kind’s greatest creation has always been its cities.” Kotkin, J. (2006)

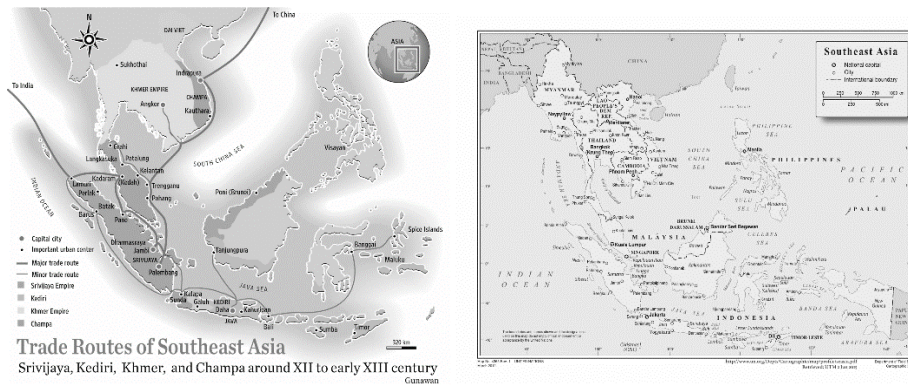


Figure 1: Trade Routes of Southeast Asia circa 11st – 13rd (left); Southeast Asia political map as seen today (right)

Sources: Gunawan (2008) (left); Department of Field Support (2012) (right)

The Lands, the Sea, the Winds:

The sub region of Asia remarked itself as the great meeting point of the exotic land that lay between India and China on the critical point of sea passage way (Hall, 2011) and was called as ‘the Lands Below the Winds’ defined by the seasonal monsoon and geographical context. However, Southeast Asia was a ‘place of fluid pluralism’, where many states during the time rose and fell relatively frequently (Reid, 1999: 12). Therefore being the place of ‘openness’ that adopted the cultures from other world, which merged with localization and local wisdom. Southeast Asia played a critical role for the global commercial expansion (Reid, 1999: 3).

The expression of the term ‘lands below the winds’ was once again noted in the classic literature by Reid (1988, 1993, 1996). The development of cities were noted by many Asian and Western scholars namely, Hall (1964), McGee (1967), Kotkin (2006), Reid (1980,1988,1993,1996) Masashi (2009), Tarling (1999, 2001), Kasetsiri (1992), Winichakul (1994), Clammer (1996), Leinbach (1999) and a few more. All pioneer studies formed the great foundation for the understanding of Southeast Asian port cities. However, further investigations still need to be done to determine the micro dimension of traditional streets’ model of Southeast Asia. The model in which should imply the significances of traditional street in the Southeast Asian’s paradigm.

In early centuries of C.E., ‘Southeast Asia’ was unknown neither in terms of name nor of definitions of boundaries. During the early of Christian era, Indian merchants defined these unclear boundaries as *Suvarnabhumi*, which later coined up by the Malays as *Nusantara*. Earlier scholars believed that the name was called ‘Land of Khersonese’ (or Malay peninsula), derived from the ancient Greek term, ‘Land of Gold’ (Hall 2011:1-3). Indian, Chinese, Arab and Western all knew that this is the ‘Spice land’ of the world. The lands which cover the large area from South of Myanmar, Laos, Siam and Malay

peninsula and included some parts of Sumatra and Java island. It was also considered by its neighbours in ancient time i.e., the Chinese called it Nanyang and the Japanese Nan'yō, both names meaning “South Seas,” and South Asians used such terms as Suvarnabhūmi (Sanskrit): “Land of Gold”) to describe the area (Leinbach, 1999).

Long before the first visitors from Europe arrived in this place, this land was already in contact with India and China with respectful and peaceful interconnection. After the European recognised the existence of the peaceful land that existed over Indian ocean to the east, the name was given as ‘Far East or Further East’ in reference to the location taking into account the known bearing of India which existed paralleled to the Chinese civilization on the other side. Existing between these two great world civilizations bore great opportunities and advantages for this ‘plentiful land’ to developed their entity.

Historians have shown that most historical evidences on settlements in Southeast Asia remained obscured for many reasons, but it was never denied that the first settlements were associated with foreign trading contacts (McGee, 1967:31). Historical evidence indicated that the three major empires emerged during the first to second century were the Funan Empire located in lower Mekong delta, the Champa Empire in the mid and south of modern Vietnam and the empire of Lungkasuka located on Kra Isthmus. This is where the local mainland adopted the influences from the trading between the Indian and the Chinese, the first two visitors, who were interested in the spice land. The cities growth emerged ever since the empires extended their boundaries and made connections with other parts of the world.

Clammer (1996) pointed out 3 principles that guided the city growth during that period which were focused on the interplay between; a) religion; b) kinship and sociological factors; and c) ecology. These three factors were mentioned in order to perceive the significance of social structure and social values of Southeast Asia in the context of history before the rise of the age of commerce, whereby the cross-cultural relationships gradually became more important factors. Clammer (1996:17) also sketched a broad scheme of classification of social types. For the religious dimension, there are four-fold classification emerged; a) The mainland Theravāda Buddhist (in Myanmar, Thailand and Cambodia) and the western part of Mahayana Buddhist (in Vietnam); b) The South Peninsular Muslim (in Malaysia, Southern Thai, parts of Indonesia and southern Philippines); c) The Christian on the East (in most other parts of Philippines and eastern Indonesia) and d) The tribal or animistic cultures (in Northern Thai and the Hills of Vietnam).



Figure 2: Map of Southeast Asia circa 1400 CE, showing Khmer Empire, Ayutthaya Kingdom, Lan Xang kingdom, Sukhothai kingdom, Champa, Kingdom of Lanna, Dai Viet and surrounding states.

Source: Javier (2011)

Religious and sociology were one of the most influential aspects that affected the local and indigenous lifestyles, custom and practices. Trading and religious activities took advantage as part of the exchange of cultures and beliefs. Siamese society reflected Theravada values, which emphasised gentleness and meditation (Lockard, 2009: 59) but unlike in Vietnam, where Chinese influence was much greater, adopted an imperial system in which the emperor was considered a ‘son of heaven’. Malaysia (and Indonesia) strongly practiced Islam after the spread of Islam from the Middle East in 1300s. Expansion of Islam in Southeast Asia concurred with the rise of the great port of Melaka in early 1400 (Lockard, 2009:65).

Apparently the essence of the trade routes were not merely in the dominance of commercial or business activities, but have served for variety purposes such as the exchanged ideas, skills, customs and religions. During late period of Srivijaya Empire (6 -12 century AD), the coastal cities became the strategic points of the beginning of maritime trades activities. McGee (1967:35) mentioned a series of port cities during that time such as; Indrapura (Danang, Vietnam), Grahi (Chaiya, South Thailand), Ligor (Nakorn Sri Thammarat, South Thailand), Singora (Songkhla 1600s), Lumini (North Sumatra, now Aceh), Jambi (east coast of central Sumatra), etc.

Historian emphasized that international trade has been a major factor of Southeast Asia since there were trading cities and trade-based kingdom in the past of this region. But after 1400s or early of the age of commerce, the rapid growth of trade network offered the variety of internal and external sources (Reid 1980:235). Correspondingly on the other side, the Mediterranean started to search for their luxury items from the East.

After the collapsed of Mongol Land's route or classically called the “silk routes” during Yuan Dynasty (1279-1368) there was a new emphasis towards the sea-route. The Ming (1368-1644) later reached their peak trading era by engaging series of fleets (voyages) sent out to Southeast Asia, where the ports became the centres of exchange with the Arabs, here was where the West met with the East. Chinese traders play a most important role since then Chinese emperor paid high attention to their business and trade activities.

O'Connor (1983) cited Georges Coedès (1968) French historian who described the characteristics of the Southeast Asia seas as;

“A veritable Mediterranean formed by China sea, the gulf of Siam and the Java Sea. This enclosed sea, in spite of its typhoon and reefs, has always been a unifying factor rather than an obstacle for the people along the rivers.”

Chinese influence from the two dynasties; Yuan Dynasty (1271/1279-1368) established the Sino-Arab routes. Later Ming Dynasty (1368-1644/1662)-Age of Commerce had great contributions to the expansion of port-cities to entrepôt. Ming Dynasty sent their fleets to explore the world, led by Admiral Zheng He, who visited many parts of Southeast Asia's ports and the mainland. These ports are where Chinese established a strong connection with the rulers of the empires during 15th-16th centuries. Some important points to be concerned such as the Zheng He voyages that affected to the world economics and urban ports growth. Seven naval expeditions (1405-1433) mentioned took great opportunities to introduce the Chinese knowledge and system to the world. As before, Zheng He fleets started from Nanjing and Quanzhou en route to visit Quy Nhon in central Vietnam (Champa), Ayutthaya or Siam (Thailand at present), Melaka, Palembang, Surabaya then to several places in India especially Cochin on the West. His route went as far as northeast of Africa and Mecca in the red sea region of the Middle East.

The emergence of Melaka coincided with the rise of the Ming Dynasty and its outward-thrusting foreign policy and promotion of economic exchange, a policy reversed by the mid-1400s. All maritime routes linking the major civilizations to the east and west of Southeast Asia led through the Straits of Melaka (Andaya and Leonard, 2015: 237). Melaka was easily accessible to ships traveling to and from China or India. Tomé Pires, a Portuguese explorer who witnessed the greatness of Melaka in 1512 confirmed the spectacular port of the world, when he wrote in the Suma Oriental, that Melaka was “*no equal in the world*” in its vibrancy as an entrepôt. He further added,

“Melaka is a city that made from merchandise, fitter than any other in the world. Commerce between difference nations for a thousand leagues on every hand must come to Melaka”

The Suma Oriental of Tomé Pires (1512-1515)

Urban History & Structure of Cities:

McGee (1967) described the broad view of Southeast Asian cities development. Each city played their roles differently though a period of time. From the first phase starting from 3rd century B.C., showed three types of the patterns - *sacred cities*, administrative cities, and coastal cities. The *sacred cities* emerged from the interior part of a country (or existing empire at that time) and mostly function as capitals with religious structures, a king-powered system and an agricultural system. The *administrative cities* were cities

that reflected the hierarchy and acted as the imperial city, the centres of political power that also housed the sacred structures welded with the religious system. For the *coastal cities*, which were mostly developed by traders and merchants, many of these settlements also function as the capitals. Marketplace, economic hubs, and technological innovation were developed. However cities' development in this phase depended on their prosperity on trade.

The second phase was the time of *the Colonial urbanisation* which began from early 16th century especially when the Portuguese and Europeans started their trade policies with China and India by direct control over the region with the exception of Ayutthaya (in Thailand). Large-scale market and trading system were opened to serve the global market business scale. Ports were the places where colonial cultures were absorbed with other cultures endemic of the society to form a hybrid cultures with multi-ethnic characters.

The third and the fourth phases were the periods of independence (post-colonial) in the mid 20th century and the advent of modern era. These phases rapidly changed the cities where the growth was depended upon the open-market economic trade, which extended the scale of cities' and the urban areas. Beyond these four phases that categorised urbanisation in Southeast Asia, it was the sea trade-based factors that emerged the cities port zone as described by well know McGee's model of 1967, which found the similarity of what have exhibited. The land use pattern has the focal point on its colonial port zone.

From McGee studies, the urban developments in Southeast Asia were formed by rapid growth during the second phases and especially on the coastal cities, which served trade activities. The key elements of urbanization such as Royal Institute location, river or river mouth, religious activities, transportation networks, residential area, and commercial area are typical settlements for most of traditional cities/towns in Southeast Asia urban growth. The business area were adopted the physical setting from India and China and later was influenced by the West. The commercial area started from open space that referred to the mobility and flexible marketplace and for several purposes of used.

PORT CITIES AS THE TRADE NETWORKS AND PLACE FOR EXCHANGE

The development of ports cities in Southeast Asia was an outcome of the rising maritime trade (Reid, 1999; Masashi, 2009). The relationship between India and China and their knowledge of seasonal monsoon since the first centuries rose up trade activities and embed new layers of urban port settlement along the coastal line. Many towns and cities were only fisherman village settlements before the golden age of maritime.

Since the beginning of their role as international ports, Strait of Malacca became the well-known strategic passages that link the world to China. Chinese trading policies during the reign of Ming's Dynasty were one of the important factors that clearly reflected the development of Southeast Asia's ports and their culture.

Chinese urban merchants used their wealth to scale the rigid barriers of class. The layout of Chinese city reflected the priority of their society (Kotlin, 2006). The palace of the rulers placed in the centre of the axis, the market, and other residential area were placed in the peripheral location. This pattern of the city in Asia is similar in term of hierarchy and urban structure.

Masashi (2009) mentioned that Port cities were a common and ordinary type of city found everywhere in the world. Port cities were often important political centres, hub of regional economies. Ports were the place where new ideas, arts, technologies were developed in the ‘melting-pot’ of overseas and home cultures. Moreover Masashi emphasized that port city seems to belong to the country but, in fact, also belong to maritime world trades that connected it to the outside world. Port cities apparently were the sites where cross-cultural exchange happened and how people experienced the cities. The place represented the local culture and customs of society were to the foreigners who confronted it. The economics pattern of Southeast Asia cities shaped the characteristics of the port zone (McGee, 1967).

Ports were marketplaces with especially good location, priority of accessibility and transportation networks. Since the pre-colonial era, port cities fostered not only economic but also cultural exchanged (Lockard, 2010). Southeast Asian entrepôt during early modern era adapted all form of variety either physical or non-physical aspects, but the significant point is, what that been exhibited on the streets were and are still, the people’s lifestyles and their activities.

FORMS OF URBAN ELEMENTS AND ITS INFLUENTIAL FACTORS

Southeast Asia urban port cities emerged, rose and fall through times. They shared some similarity in the components that shaped the characteristics. The research has identified some components in the urban elements such as follows; a) nearness to a river or sea; b) the royal institution; c) the religious centre; d) the indigenous settlement area; e) the commercial area or marketplace and f) the transportation hub. These features were parts of the investigation through several selected cities and can be seen illustrated in the table below:

Urban elements: case studies

Surveys had been conducted in three major locations in Southeast Asia namely; a) Sampheng and Thong Wat Street, Yaowaraj, old Bangkok; b) Jonker Street, World Heritage City of Melaka; c) Hang Ngang, Hang Dao, Ta Hien, Hang Buom and Hang Khaai street in Hanoi Ancient Quarters. These study areas formed the basis of the understanding of the ancient city structure and street characteristics of Southeast Asia. Many answers were derived from these studies but the paramount point here is to demonstrate that the informal context of the street characters hold true in every street studied.

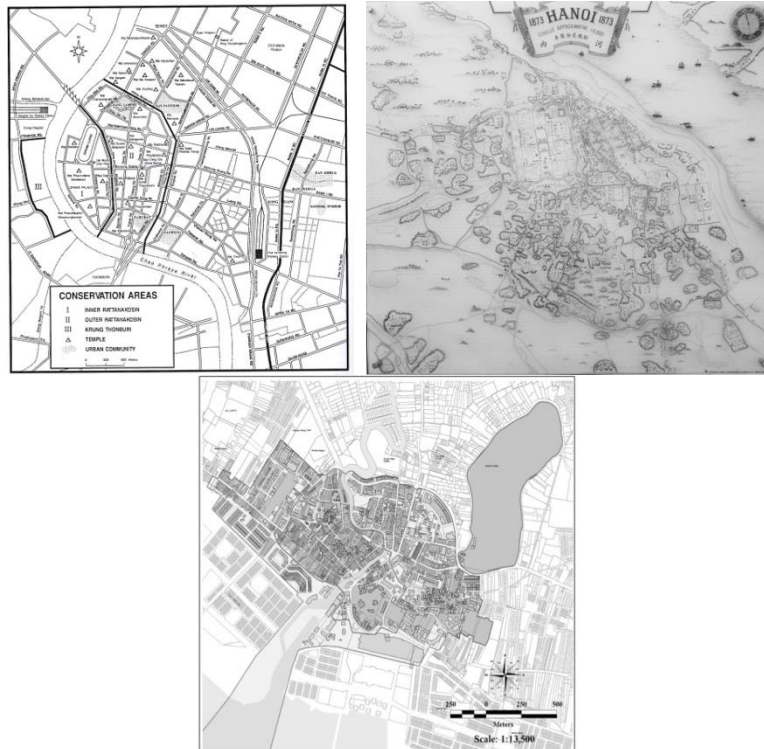


Figure 3: Map of Inner Bangkok, showing the study area ‘Sampheng’ located southwest in Rattanakosin conservation zone” (left); Map of Hanoi’s ancient quarter (middle); Map of Melaka city and commercial area circa 1895 (right)
 Sources: Logan and Askew (1994) (left); edited by author (middle); Pusat Konservasi Negeri Melaka (n.d.) (right)

Table 1: Urban Elements of selected Port Cities of Melaka, Bangkok and Hanoi

Urban elements / Cities	Thailand Bangkok	Vietnam Hanoi	Malaysia Melaka
a) Location: nearness to a major river/sea	Chao Phraya River connected to Gulf of Siam	Red river connected to the South China Sea	Melaka river connected to the Straits of Malacca
b) Royal Institutions	The Grand Palace within the walled city at Rattanakosin Island	The Citadel located on the west bank of Red river	The Sultan’s Palace replaced by the Portuguese Fortress of a-Farmosa
c) Religious centre	Wat Prakaew - Emerald Buddha Temple - Theravada Buddhism	The Grand Pagoda in the centre of the main axis in the Citadel - Mahayana Buddhism	The State Mosque – the Portuguese Fortress of a-Farmosa later the Christ Church built by Dutch

Urban elements / Cities	Thailand Bangkok	Vietnam Hanoi	Malaysia Melaka
d) The indigenous settlements	Indigenous groups mixed with Chinese immigrants from south China	The rehabilitation system after the Chinese imperials left, the indigenous group reoccupy the land surrounding the Citadel.	During the Sultanate period, on opposite side of river were the indigenous population but after the Dutch period replaced by Chinese immigrant community.
e) Commercial area	Mostly occupied by Chinese merchants	The guild system representing specialities from each village occupy a specific area.	During the Sultanate era, it was an international entrepôt – Occupied by traders from Middle-east, India and the Far-east.
f) The street system	China town, located on south of the old city wall started beginning of the Chakri dynasty and the big shift happened during the reign of Rama IV	The ancient quarter existed on the west side of The Citadel. The 15 th century guild system evolved again when Hanoi become the capital for the second time in 1887 and this made it possible for the establishment of present day specialized streets.	Commercial area extended to the east bank of the river since Dutch-Melaka period and the same street system exist today.

STREET CULTURES AND THE OVERVIEWS FROM CASE STUDIES

Cultural significances shared across boundaries have to be more arbitrated, looking on how the streets creating strong sense of places, emphasising the uniqueness street characteristics. Streets culture or in particular, the street activities and peoples' perception of the street represented the entity of each place. The correlation of spaces, activities and times are the essential components of the place that need to be learnt and understanding that activities themselves will never exist without space.

In Melaka, the core zone of the world heritage city, after the establishment of weekend night market famously known as Jonker Walk (on Jonker Street) creates a modern means to transform back the traditional street in its full sense to the people. The economic values rose and the activities brought massive number of visitors and tourists from all over the world to experience that night shopping activities in an approximately 800 meters length of the streets flanked by some significance old shop houses which some dated back to the 18th Century style.

In Hanoi old quarters, the scene of local people doing their daily activities, street vendors and petty traders, high-density motorcycle volumes, and series of the tube houses and guilds show the strong senses of the Vietnamese street typology. The guilds transformed with old style shophouses since 19th Century is the evidence of Hanoi's local lifestyles making each street unique with specialised trades initiated by the guilds (Hoang and Nishimura, 1990).

Bangkok (*Krung Thep*) founded in 1782, was the capital after the Ayutthaya reign and has adopted the city's planning concept from the previous capital. Thailand in general, adopted their culture with continuously strong relationship with Chinese

merchants. Bangkok City with the arrangement of zoning regulation emerged the area for Sino-Siamese resident, which later named as China town. Since 1853 The Chinese settlement in *Sampheng* had become the bustling market with full of supply for wholesale and retail product. *Sampheng* as the heart of Chinese community in Bangkok, represent the ideology of commercial area of Siam until today.



Figure 4: Illustrated the streets scene from cases study, Bangkok (left); Hanoi (middle); Melaka (right)
Source: by the author (2015)

In analysing all the three case studies, it is generally noted that all the cities demonstrated a common typical characteristic; that the main activity patterns of the local inhabitants are informal in nature and this is reflected by the way space is structured and organised. In order built forms to response to this characteristic, they must express the capacity to accommodate those informal activities through proper design and layout. It is important to express this informality from the internal spatial organisation of a single building, through to the external relationship within the layout of groups of building and the activities that operate within and around them. Therefore the streets remained as interface between buildings and other urban activities.

The complexity of street activities and the ground-level uses are part of the urban identity and, therefore, specific design emphasis should be given to enable these activities and uses to operate within an organised level. (note: Being organised does not necessarily reduce the state of being informal.) Strategic organisation of various spaces and distribution of activity nodes are essential as an integral approach towards accommodating the diverse activities and uses on the street (Idid, 1991). The nature of attractions of the various land uses and activities has to be noted. For example, a shop may have a greater attraction to shoppers as compared to hawkers who may only operate to compliment the shopping activities in terms of providing on the spot refreshment for shoppers. The movement of shoppers is influenced by these kinds of attractions and

therefore it is vital to employ various design concepts to achieve maximum interaction between land uses and activities.

Integrative Space: Integrative space plays a vital role in the overall space organisation within the urban context-enhancing the urban identity. There is a need to reintroduce integrative space within the urban context so that it can accommodate all the informal street activities as mentioned before. It will also encourage continuity at street level of various dislocated individual developments. The essence of the connections between each component of the recommendation is derived from the traditional example (Idid and Sholiah, 2004). This is regarded to be the key formula for a successful environment as well as enhancing the local identity.

CONCLUSION

Since the beginning of time when Tomé Pires first laid eyes on the port city of Melaka, he described that there was no other place in the world he could compare with Melaka even the most vibrant European port as Rotterdam. He was making remarks of Melaka not based on great monuments he saw or any colossal buildings that struck his awesome sight but merely on the grand scale trading activities he saw. Remarkable it was since it was only the sight of people from all over the world congregating on this one port doing business in general and what seemed to be “in the open” without any grand formal architectural forms to boast of. This was the scenario of the port cities during the hey-day of the port cities. During the period of colonial administration, saw transformation of more formal trade building premises, which later took form into what we see today, of shophouses. From open field where trading activities occurred now formal buildings seemed to be the fad. This gave rise to the “streets”, the space bounded by buildings on either side of it. Following the traditions of the informal markets, streets in Southeast Asia never seems to be designed just for access or transportation way. Market or trading activities have never been confined to an internal space and generally spread out into the streets. Streets became the realm of many urban activities sometimes less dependant on the trading activities. Informal trading activities from street vendors, petty traders or hawkers became the common scene of the street activities.

Streets do not transformed much from the early period where they started until now. Streets are where public occupied the space and live, the space that offered formal and informal activities. East culture is more flexible in the way of the activities are arranged on the street. Informalities are most preferred. However, informal activities that occur as in the case studies can be categorised into three types; fixed activity, semi-fixed activity, and mobile activity. Mostly emphasized by streets vendors who play the most important role that can be noticed by the users and visitors alike.

Flexibility and mobility are the key attributes to the streets informal settings The settings on traditional streets require more emphasis on the informal activities, as it is the very essence of the character of Southeast Asia’s traditional streets. Therefore, it is important to uphold this value towards the street design and preservation.

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LEADERSHIP STYLES: INCENTIVE OR DISINCENTIVE APPROACH IN ADDRESSING STREET VENDOR PROBLEMS IN JAKARTA AND BANDUNG, INDONESIA

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Abstract

The problems of street vendors have long been experienced by most big cities in Indonesia. A newly emerged city leadership style in Jakarta and Bandung City shows two different approaches towards sustainable solution of street vendor problem. While Governor of Jakarta applies an incentive approach to street vendors by transferring them from the streets of Jakarta to appropriate place, Mayor of Bandung City applies disincentive approach to the buyers of street vendors by giving penalty to those making transaction with the vendors in “red zone”. This study was undertaken in Jakarta Metropolitan, the Capital City of Indonesia and Bandung City, the Capital City of West Java Province. The choice of Jakarta and Bandung was based mainly on the new paradigm of city leadership in Indonesia as reflected by these two leaders of the city. They are both out-of-the-box leaders. Both approaches exhibit the positive results on the easiness of traffic in the area, positive image of the area as perceived by most citizens, and cleanliness.

Keyword: street vendor, city leadership, new paradigm of leadership, incentive to seller, disincentive to buyer

INTRODUCTION

Street vendors also known as *Pedagang Kaki Lima (PKL)* among local Indonesian have long been a dilemma for city authorities. On one hand, the street vendors provide urban employment that everyone can get hold easily. On the other hand, if the street vendors are properly managed, they may create urban environmental problems. Amid inability of the government to provide formal urban jobs for the citizens, the street vendor is an easy and short-cut answer to this persistent urban issue.

The presence of street vendors in city is due to various socio-economic and political factors, for example, urbanization process (UN, 2000; Chirisa, 2009a; Garoma, 2012), greater opportunities for earning income in cities (Charmes, 1998), insufficient supply of formal sector jobs (Charmes, 1998; Chirisa, 2009b), easy entry (ILO, 2000), rural and urban poverty (Chen, 2001; Timalisina, 2011), and urban-centered development (ILO, 2000; Suharto, 2002). The outcome of these social, political and economic factors is sometimes reflected as the incapability of the authorities to provide formal jobs (Carr

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et al., 2000). ILO (2000) asserted that the challenges of the informal sector such as people engaged in informal activities are poor, the sector is disorganized and unstructured, and the informal activities are illegal. Vanek et al. (2012) also recognized the street vendors and hawkers as informal economy. Similarly, Chen (2012) stated that formalizing the informal economy would need a comprehensive policy. Due to specific characteristics of street vendors on easiness of entry, the street vendors are always present in different cities with different level of economic development. In Bangkok, for example, the number of street vendors is significant because of similar factors with other Asian cities. Bangkok exhibited good practices in handling street vendors, for example, the presence of *Chatuchak* Weekend Market to reduce the number of on-street vendors at roadsides. The sellers in *Chatuchak* market were ex-street vendors. Other practice is the utilization of open spaces for street vendors during certain days (Suharto, 2002).

The dilemma of street vendors experienced by Jakarta Metropolitan and Bandung City. Jakarta, for example, during the period of 30 years was not able to solve the street vendor's dilemma. During that period, until the present administration of Jakarta Metropolitan under Governor Mr *Joko Widodo* or *Jokowi*, the approach to resolve the dilemma was rested on the power of enforcement, eviction and command and control. As a result, physical resistance was received by the city authority. This can be seen rather a superficial than sustainable solution.

Similarly, in Bandung City, the long traditional way of handling the street vendors has created strong resistance from street vendors who were mostly urban poor. The use of special police force in dealing with street vendors by previous city authorities was prominent but notoriously recognized by urban pressure groups as inhumane approach. As a result, the work of resolving street vendor issues in the city has never been done in a comprehensive manner until today. The command and control instrument has been prevailing for quite long time, until the new style of leaderships emerged.

TWO ICONIC LEADERSHIPS

Two emerging leaderships in Jakarta, as exhibited by past Governor of Jakarta (*Joko Widodo* is presently President of the Republic of Indonesia), as well as in Bandung, as demonstrated by Mayor of Bandung City, have become a new iconic political leadership in Indonesia that attracts most middle income level citizens to support them. Their fresh idea to develop the cities, courageous act to break-through the rigidity of bureaucracy, and new approach to deal with persistent problems of urban poor are among key factors that lead them to be iconic leaders.

Whilst a conventional image of a political leader in Indonesia is commonly depicted and perceived (by most people) as corrupted, building grandeur self-image with a mentality to be served not to serve, keeping distant with people except during election season, inflexibly to current regulation – regulation is regarded as the goal not the tool to achieve goal, lack of innovation, monotonous, reluctant to understand the problems from the first-hand, quantity oriented disregard the quality of accomplishment, refuse to accept criticisms particularly from opponent and whenever criticism is delivered in an improper manner, and other negative images of the Indonesian political leaders. With this long-standing perceptions of the people on political leaders, the emergence of promising leaders, as reflected in their track records, during their terms were warmly welcomed by

middle income people. The middle income people are being the catalyst for other strata of urban community, particularly among the low income people. The middle income people are the most well informed people as they are more accessible to the information well educated. Meanwhile, the high income citizens are the minority and they are usually away from the politics.

The emerging leaderships in Jakarta and Bandung were noticeable when *Joko Widodo (Jokowi)* and *Basuki Tjahaja Purnama (Ahok)* were elected Governor and Vice Governor of Jakarta, and *Ridwan Kamil (Kang Emil)* was elected Mayor of Bandung City. Joko Widodo brings a new term in managing city, the “*blusukan*” (proactively identify the problems by visiting source of the problems). By doing the *blusukan*, Jokowi understands the root-cause of the problems and immediately takes actions to cope with the problems and issues. However, the actions taken by the Governor were not always smoothly implemented all the times since majority of the members of city councils were from the opposition parties. The City Council members from the opposition parties, most of the time, hampered the programs, particularly during budgeting and implementation phase. For instance, when the first time the Governor launched the KJS (*Kartu Jakarta Pintar* – literally means Smart Jakarta Card), a break-through of education subsidy to the citizens, a City Council member criticized the Governor for the programs as overlapping (Kompas, 21 Dec 2012), and the Medium-term Plan of Jakarta was unclear (Merdeka, 13 March 2013). The essence of these criticisms was simply criticizing regardless of accuracy and appropriateness of the substance of the issues for checks and balance function of the city councils.

The study attempts to understand the way these two iconic leaderships in Jakarta and Bandung, with all their weaknesses and constraints, cope with the dilemmatic problems of street vendors, and tries to contrast the two in terms of the impacts to the city by employing certain methodology.

METHOD OF STUDY

This study was undertaken by doing field observation, interview with actors and stakeholders, internet research, and using secondary information. The study takes Jakarta and Bandung Cities as the case, since the leaders of these two cities show outstanding leadership, those desired by most people.

The discussion is focused on two different approaches on how to manage street vendors towards better city for all. In most cases, illegal street vendors created negative urban environmental impacts that bring the city into dilapidated condition. From Surakarta and Jakarta cases (with the same leadership style because of the same person), the style to cope with street vendors was emphasized on providing incentives for the street vendors. In the case of Bandung case, disincentive was applied to buyers or customers to discourage street vendors to operate; hence street vendors would not operate without customers.

TYPICAL STYLES OF THE CITY GOVERNMENT ON STREET VENDORS HANDLING

There are four styles of the city government in handling street vendor’s issues with respect to approach i.e. incentive-disincentive of customer-street vendor. The styles are (1) incentives to street vendors (2) disincentives to customers (3) disincentives to street

vendors and (4) incentives to customers. Table 1 shows two leaderships exhibited in Jakarta Metropolitan and Bandung City in managing street vendors with minimum social problems while promoting urban environmental condition and welfare of the citizens.

Table 1 Various Approach on Street Vendors Handling in Indonesian Cities

		Approach	
		Incentives	Disincentives
Actor	Customers	<ul style="list-style-type: none"> Jakarta (post-relocation) Q1	<ul style="list-style-type: none"> Bandung Q2
	Street Vendors	<ul style="list-style-type: none"> Surakarta Jakarta (pre-relocation) Q4	<ul style="list-style-type: none"> Ambon¹ Batam² Bogor³ Depok⁴ Jambi⁵ Jember⁶ Palangkaraya⁷ Pekanbaru⁸ Purwakarta⁹ Tangerang¹⁰ Semarang¹¹ Q3

Note ¹siwalinews.com, ²humasbatam.com, ³rribogor.com, ⁴republika.co.id, ⁵jambi-independent.co.id, ⁶satpolpp.jatimprov.go.id, ⁷kaltegos.co.id, ⁸riauaktual.com, ⁹republika.co.id, ¹⁰republika.co.id, ¹¹suaramerdeka.com.

Quadrant-1 (Q1): 'incentive-to-customer' approach, Q2: 'disincentive-to-customer' approach, Q3: 'disincentive-to-street-vendors' approach, Q4: 'incentive-to-street-vendors' approach,

The 'incentive-to-street-vendor' style, to certain extent, is the most difficult approach in terms of patience, determination, resistance, plan and time. But this approach is the most humane and reasonable attitude towards people. Rational street vendors would prefer this approach because of various incentives they receive. Amid the incentives received by street vendors, the implementation does not necessarily smooth and immediately accepted by street vendors. For so long, the level of distrust of people to the government in Indonesia has been high. In the past and at present, most public service officers have no empathy to the problems of poor people. The mentality of 'if could be made difficult why should be made easy' of the public service officers in serving people still exists. Practically, the government needs and intensely approaches and entertains the people's needs only in 5-year interval where general election takes place. By this condition, every single government program would be received cautiously and scrutinously by people, even incentive for them would be resisted first prior to acceptance.

The 'disincentive-to-customer' approach was firstly introduced by Mr. *Ridwan Kamil or Kang Emil*, Mayor of Bandung. He realizes that 'disincentive to street vendors' approach, which so far been implemented in Bandung City and most cities in Indonesia, could only create strong resistance from street vendors. As an educated people who received master degree from a US University, Mayor of Bandung fully understood this situation. The pilot program was applied in some protocol road in Bandung City such as

Jalan Merdeka, Jalan Asia-Afrika, Jalan Dalem Kaum, and Jalan Kepatihan and the program was resisted by the street vendors.

The ‘disincentives-to-street-vendors’ style was the most popularly known and widely applied by the city government in handling street vendors. Amid storing latent social problem, this approach is very popular among Indonesian city authorities for some reasons: (1) The easiest way for most city authorities in Indonesia, which are command-and-control-heavy (2) Instant results (3) Deliberative planning is not necessary (4) Inexpensive, and (5) needs only physical power. With the politician-type of city leaders, business-as-usual government, and lack of pressure groups, the ‘disincentive-to-street-vendors’ type is no wonder the most popular. This approach is hopefully gradually vanished when the elitist regime of the government gone as the country democratically matured.

The ‘incentive-to-customers’ is rarely implemented. Again, in the post-relocation phase of street vendors in Jakarta, this ‘incentive-to-customers’ is implemented by providing facilities such as free Wi-Fi, escalator, easy parking, children play port, and door prizes to encourage customers to visit and purchase.

SURAKARTA’S AND JAKARTA’S CASES: INCENTIVES TO STREET VENDORS

Present Governor of Jakarta, Joko Widodo, was formerly Mayor of Surakarta during the period of 2005-2010 and 2010-2015 (Wikipedia, 2014). Joko Widodo elected the second term of Mayor Surakarta by more than 90% votes without campaign, because of his ability to serve the citizens to cope with the root problems of health and education. Health and education are two basic needs of the citizens that were clearly understood and appropriately addressed by Joko Widodo. All citizens enjoyed this facility. This condition has made up more than 90% of citizens voted Joko Widodo for second terms of Mayor of Surakarta.

Banjarsari, Surakarta Case

Banjarsari Surakarta and *Block G Pasar Tanah Abang Jakarta* cases are two good examples how incentive was able to solve persistent problems with stubborn street vendors and hawkers. The growing problems of street vendors and hawkers in many cities in Indonesia, including Surakarta and Jakarta created many urban problems namely traffic jam, over-crowdedness, inviting crimes, uncleanliness and other social problems, since the street vendors and hawkers occupied urban public spaces such as walking lane, roadside, parks, and other spaces. To deal with the street vendors and hawkers’ problems, most of the city governments in Indonesia generally carry out “traditional” procedures which are enforcing street vendors to vacant the occupied public land by employing special police force (Gautama, 2011). The “traditional” procedure is considered as a short-cut, inexpensive and easy way to cope with the problems, which does not need specific treatment. The procedure does not offer comprehensive resolution to the problems. It is an on-off situation and provides temporary solution. Immediately after action was taken, the street vendors cleared from the street and after sometimes they returned to the street. The act also creates strong resistance from the street vendors, generates social problem, and keeps urban poverty exists. This approach does not, therefore, solve the root-cause of the problems.

The activities of street vendors and hawkers are merely economic activities. The negative impacts of the street vendors' activities are then by-product of them. While the government is unable to create sufficient formal jobs, the street vendors and hawkers' issues exist because of urban poverty and difficulties in getting formal jobs. The city government of Surakarta under Joko Widodo's administration attempted to include this social issue in resolving the street vendors' issues. The city government realizes that the capability of the government to create formal job is limited and thus informal economic activities like street vendors is still needed. Joko Widodo also thought that street vendors should be empowered by facilitating them with appropriate place and environment (Gautama, 2011). The city government of *Surakarta* did different approach, which was diametrically different with what was usually done by most city governments in dealing with street vendors and hawkers.

Based on long-term observation on the street vendors activities in some big cities in Indonesia namely, Jakarta, Bandung, Semarang, Surabaya and Pontianak, the characteristics of street vendors and hawkers in these capital and secondary cities of Indonesia were normally signified by the following attributes: (1) Illegal or not recognized by laws (2) small individual financial capital with only subsistence economy characteristics (3) irregular operation hours with non-permanent business place (4) labor-intensive than capital-intensive feature but with small number of workers per unit of business (5) run by unskilled people or without specific skill (6) irregular commodities according to market and skill (7) their business places are where lavish customers exist. The last feature has turned into the basis of street vendors handling in Bandung City. It is discussed later in other section.

At the initial stage of the idea to relocate street vendors in Banjarsari Surakarta was strongly opposed by the vendors. They dubbed their hesitation on whether or not the government of Surakarta City would be able to guarantee on equivalent earning income when they were in Banjarsari. They proposed to the city government not to be relocated to other places rather they preferred to be reorganized at the present place. However, the Surakarta City Government insisted on the plan for the main reasons of the environmental impacts, particularly on cleanliness of the city and traffic constraint. City government also argued that the relocation of Banjarsari's street vendors was urgent because of fast growing number of street vendors that would probably worsen the social implications when the relocation took place. Significant increase on urban environmental impacts would also take place with the increasing number of vendors, the needs of more open and urban green spaces for the city, and also pressure from community surrounding the area expressing their complaints on bad impacts of street vendors' activities on the environment and the property. The street vendor activities have impacted the price of property to be significantly collapsed.

The strong resistance, as exhibited by street vendors, did not change the standpoint of the city government, since the city government indisputably confident that the relocation was not at all the eviction. Through the relocation plan, city government ensured that illegal status of street vendors would actually be promoted to legal body by placing them in a legal venue, and empowered them to be legal partners of city government in providing informal jobs, within the overall frame of developing people's economy. This glorious plan, which would not be clearly understood by the street vendors, was translated smartly and accurately by the city government by employing

business-like lobbies that precisely win the heart of the street vendors. For street vendors who are mostly Javanese origin, the feeling of '*diwongke*' (a Javanese word that literally means: being treated humanely) is the highest hierarchy in the Javanese reverence system. The city government fully understood this Javanese culture.

To respect the feeling of *diwongke* of the street vendors, the Mayor of *Surakarta* organized business-like lobbies by inviting the street vendors for free lunch or dinner again and again without at all discussed the relocation plan. These free lunches and dinners were organized for more than 50 times. After more than fifty times heart-to-heart meetings with the street vendors, Mayor Joko Widodo told the group on the relocation plan. The discussion on the relocation plan was then carried out in relax manner and heart-to-heart exchange views. The discussion led to a reasonable proposals and conditions from them. Three major conditions for the relocation were proposed to the Mayor. The major points of the proposals were: (1) they wanted to have appropriate building and location of the new place (2) they needed assurance of from the Mayor that old customers visited the new place (3) they needed the Mayor to ensure that their income is not affected. Mayor Joko Widodo responded that all three points of the proposal were accepted with some notes. He could not give a warranty that their income would be maintained rather, he would make the best efforts to support the increase of income for the good of street vendors.

To implement the commitments of the Mayor, in parallel with the lobbies, the *Pasar Klithikan Notoharjo*, was refurbished and restored to appropriately receive the relocated street vendors of *Banjarsari*. The street vendors were also brought to see the new location. Along with this, City Government had also re-routed some of the city public transport routes to pass the new location to encourage citizens to visit and shop at the new location. Continuous commercials in local media (TV, radio and local newspapers) to promote the new location of ex-Banjarsari's street vendors were organized. Thus, the relocation of street vendors of *Banjarsari* was successful under Mayor Joko Widodo without creating social problems. This effort did not succeed under two formers Mayor of *Surakarta*, the predecessors of Mayor Joko Widodo.

The keyword of this success story is 'relocation' not 'eviction'. 'Relocation' contains the spirit of '*diwongke*' of the street vendors. The socio-economic rights of the street vendors, as citizens, are respected. Meanwhile, 'eviction' ignores these rights and focused only on the goal of authority i.e. pseudo-quality of the city. This is the significant different between the traditional approach of 'eviction', which is normally employed by most Mayors or city authorities in Indonesia, and new approach of '*diwongke*' as introduced and successfully exhibited by Mayor Joko Widodo. During the preparation of this article, Joko Widodo or Jokowi is the Governor of Jakarta, and perhaps when this article is published he has already been elected the-7th President of the Republic of Indonesia. Joko Widodo has certainly brought a new paradigm in the public services positions from 'to be served' and 'elitist' style by keeping his image high 'to serve' and 'people-oriented' style of governing. The elitist style of governing has been exhibited by, for example, ex-New Order regime leader Soeharto, and perhaps being maintained by current style of the presidency, which is widely known by people as SBY-style. This style is not preferred by most of people as most survey placed Joko Widodo as the preferred style of the leadership of future Indonesia.

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Leadership Styles: Incentive or Disincentive Approach in Addressing Street Vendor Problems in Jakarta and Bandung, Indonesia



Figure 1: Street Vendors at Banjarsari before relocation
Source: aerbeaerbe.wordpress.com



Figure 2: Banjarsari After Street Vendors were relocated
Source: azisturindra.wordpress.com

Block G Tanah Abang, Jakarta Case

Joko Widodo, the former Mayor of *Surakarta*, who was able to elevate *Surakarta* as the center of Javanese Culture and Tradition has been declared by the City Mayor Foundation Organization (www.worldmayor.com) as one of the best 10 mayors in the world. His clean and excellent track record, Joko Widodo has been elected Governor of Jakarta; the Capital City of Indonesia with 12 million populations defeated the incumbent governor Fauzi Bowo. The past governors have bequeathed numerous problems of urban flooding, traffic congestions, public transport system, slums, illegal squatters, horizontal conflicts, street vendors and other problems.

Street vendors' problems in Jakarta are more complex than Banjarsari's street vendor case. Jakarta is the showcase of racial diversity of Indonesia. Various races with different culture and attitude with low education level mixed together add the problematic situation of street vendors in Jakarta. The street vendors in *Tanah Abang* could also generate 'easy-amid-black money' stems from the illegal charge of '*uang jago*' (security fee) that ranges from equivalent to USD 5 to 15 per day per vendor depending on the scale of the street business. The security fee was also illegally applied to parking fee. Since the parking space in *Tanah Abang* was not properly and adequately provided by the government, the manual arrangement of parking lots and fees were adopted. Every visitor was free to park their cars or motorcycles wherever they found enough space to park and pay unofficial parking charge to illegal field officer. As a result, various and complex situation such as traffic jam, crimes, circulation of illegal money took place. The illegal security fees charged from street vendors and illegal parking could reach tantamount to USD 50,000 per day (personal communication with some field sources). This problem could not be solved by four previous governor of Jakarta, since their approach was traditional 'eviction-way' business as usual. None of them innovatively introduced new approach to solve the problem with minimum social consequences.

The street vendors in Jakarta as well as other cities in Indonesia were typical with respect to causes and actors. The causes of flourishing street vendors in Jakarta were slightly unique and different with other cities. The push and pull factors were economic motives given limited skill of people, easy money, which make easier to earn money in Jakarta for the same level of education and skill compared to other cities. Other factors were sixty percent of the monetary circulation takes place in Jakarta, the presence of potential buyers of low income citizens, and easy to start business. The actors are certainly rural migrants with low level of education and skill.

With the complexity of the street vendors' problems in Jakarta, and Tanah Abang's street vendors, the solution offered by the new governor of 'New Jakarta' was a critical test-case by the Governor. It is critical because of the success or the failures will determine his future political career path towards highest political position, the Presidency. During the gubernatorial campaign, Joko Widodo emphasized his program into six: (1) Education subsidy through '*Kartu Jakarta Pintar, KJP*' (Smart Jakarta Card), (2) Citizens Healthcare by introducing '*Kartu Jakarta Sehat, KJS*' (Healthy Jakarta Card) and (3) Gradually minimizing flooding problems (4) Promoting excellent public transportation system by strengthening *Busway* system, developing monorail system and Jakarta Mass Rapid Transit System, (5) Bureaucracy reform by improving services to the Citizens (6) Slums upgrading and street vendors management.

The problem of street vendors in Tanah Abang area was very desperate. At least four predecessors of Governor Joko Widodo were unable to solve it properly because of complicated issue that rooted from intensive rural-urban migration, dire urban poverty, lack of urban jobs, involvement of gangsters and criminals, the involvement of black politicians, and potential earning source. The approach of four previous governors was merely on short-term solution by evicting street vendors without, at all, looking at the root-cause of the problem. As a result, the problem persists.



Figure 3: Street Vendors at Tanah Abang: Main Users are neglected
Source: kompas.com

The severity of the problem of street vendor in *Tanah Abang*, prior to the relocation to *Block G*, is shown in Figure 3. The most obvious situation as exhibited in Figure 3 is that the main function of road to accommodate traffic was only about 15% and the remaining 85% was occupied by street vendors. This situation constrained traffic and distracted people to visit Tanah Abang, the largest traditional market in Asia. Even the locals with high income reluctantly visited Tanah Abang unless a very important business in Tanah Abang was necessary. The severity of the problem is self-explained by the fact that four governors (three ex-generals of the army and one civilian) were unable to comprehensively solve the problem.

With sufficient experience in relocating street vendors in *Banjarsari Surakarta*, the present Governor of Jakarta employed the same approach i.e. ‘incentive-to-street-vendors’ at pre-relocation phase and then followed ‘incentive-to-customers’ at the post-relocation phase. The progress surprisingly took less than 2 months in comparison to 1-year relocation process of the street vendors of *Banjarsari Surakarta*. This is perhaps because of some reasons: (1) Joko Widodo, the present Governor of Jakarta, has ample of experience in dealing with social-engineering process in the relocation of street vendors (2) *Tanah Abang’s* street vendors are most probably more open and straight

forward, as long as they can earn money legally with government recognition amid difficulty in getting formal jobs in Jakarta, the relocation would be acceptable (3) the street vendors realized that being a legal entrepreneur in Jakarta was difficult.

Joko Widodo commenced the relocation plan by visiting street vendors and targeted relocation place at *Block G Tanah Abang* several times. *Block G* is located at the same premise of *Tanah Abang*. The new location at *Block G* was refurbished days and nights. The Governor even checked and controlled the refurbishment activities in the midnight (Tribun News, 15 August 2013) to accelerate the completion of the place. Thus the relocation plan could be carried out on time. The refurbishment also provided facilities such as escalator and overpass to ease visitors to *Block G*.

Upon 95% completion of the refurbished location for street vendors' relocation at *Block G*, the street vendors were invited to observe the new location. The total capacity of *Block G* was 968 units, while number of street vendors relocated was 941 vendors (Antara News, 12 August 2013). Thus all vendors were secured to get the unit. Other incentives for post-relocation were also provided. These incentives included 3-month free rental fee including water and electrical bills for the registered vendors who were willing to relocate. With this offer, all the street vendors were willing to relocate to a new place at *Block G*. In the meantime, Government of Jakarta is continuously improving the *Block G* to attract more visitors to shop and would then keep the street vendors off the street. The impact of relocation in reduction of traffic jam and beautification of the city is shown in Figure 4. The figure exhibits two contrasting situation after the relocation took place (left) and before the relocation (right). Many citizens commended the efforts of Governor Joko Widodo as successful without significant social issues.



Figure 4: Post-relocation (left) and Pre-relocation (right) of street vendors of Tanah Abang

Source: merdeka.com

From the two plans implemented by Joko Widodo in dealing with street vendors, one crucial point can be drawn. The crucial point is an incentive to actors, street vendors and customers are more successful than disincentive one with respect to minimizing the social cost of street vendors. Survey on 112 randomly selected costumers those directly or indirectly involved in street vendors activities such as customers, visitors, and sellers shows that 98 (87.5%) respondents perceived their agreement and satisfaction with the policy, 5 (4.5%) respondents were neutral, and 9 (8.0%) respondents perceived their disagreement and dissatisfaction of the policy. The main reason of dissatisfaction of the respondents is their concern if the relocation would reduce their income.

In contrast, disincentive-to-street-vendors approach is totally failed, as social costs and losses are high. Disincentive-to-customers approach, on the other hand, is yet to prove as successful or failure, until Mayor of Bandung City attempted to implement this policy to cope with street vendors problems.

BANDUNG'S CASE: DISINCENTIVES TO CUSTOMERS

Amid most of city government implementing Q3 approach (disincentive-to-street-vendors), Bandung City Government applies 'disincentive-to-customers' approach (Q2) as illustrated in Table 1. This approach was based on 'no demand leads to no supply'. If no customers (demand) presence, street vendors (supply) will diminish. There are several 'whys' following the selection of this cure. Why Bandung City government did not apply disincentive-to-street-vendor approach? Or why Bandung City Government did not apply incentive-to-street-vendor approach? Or why Bandung City Government did not apply incentive-to-customers approach? Mayor of Bandung has considered various options. The notorious approach of 'disincentive-to-street-vendors' would be rejected by the Mayor outright since this approach would not work well. The incentive approach, as implemented in *Surakarta* and Jakarta, certainly would not be the first choice since the annual budget of Bandung City would not be able to support the implementation of this approach. This is reasonable if it is to be compared with Jakarta, because Jakarta has practically no financial problem. However, this option would become irrational compared to *Surakarta*. *Surakarta* is smaller than Bandung in terms of population, administrative area, and annual budget. With these two opposite situations, the reason behind the application of disincentive-to-customers approach was most probably because of half-hearted innovative idea of being 'just different'.

The approach of disincentive-to-customers was also based on the fact that customers of street vendors were financially sound than the street vendors. Thus an option to impose the 'disincentive-to-customers' approach is rationalized. The Mayor is also uncertain of the effectiveness of this policy, since the approach was applied only at certain area (zone) of primary roads (protocol roads) at central business district and other prime areas, which is currently on trial period. During this trial phase, many street vendors protested the city government (Detiknews, 17 February 2014). Street vendors were also playing hide-and-seek with the authority to safeguard their business while operating illegally at designated areas.

Bandung city government has actually provided a relocation place in *Pasar Gedebage* (Gedebage Market) for most of the street vendors. However, unlike the success story of *Surakarta* and Jakarta, the new location has insufficient facilities and no

guarantee of visitors. The new location is presently a traditional market, and abandoned industrial estate of Bandung City, and it is too far from the city center with poor accessibility to the city center amid close to a main arterial road of Bandung City. In short, the new location is not ready for the relocation and hence most of street vendors rejected the program.

The results of this program are unknown since the policy is just commenced for implementation by present Mayor of Bandung City. The policy was actually promulgated in 2011 through the formulation of City Regulation No. 4 Year 2011 on the Management of Street Vendors in Bandung City, particularly on Chapter 24 Clauses 1 and 2. The former Mayor of Bandung City was not confident to implement the regulation since he was aware on the social impacts caused. Therefore he opted to implement traditional way in dealing with the street vendors, which is forced eviction.

Perceptions of relevant stakeholders on the program were investigated. Seventy respondents i.e. visitors of the area (20), customers-to-be (15), street vendors (10) and shop owners (25) perceived different feelings about the implementation of this policy. Fifteen out of 20 the customer-to-be respondents agreed with the policies, 3 respondents disagreed, and the remaining 2 were neutral. Ten out of 10 street vendors show their disagreement by noting that earning money is the basic rights of the citizens. They would keep selling although they might play hide-and-seek with the law enforcement officers. A street vendor noted that she would obey the authority if the authority would relocate them to an appropriate place with sufficient facilities as it has done by Government of Jakarta City. It is not surprising that all of 25 shop owners were totally agree with the policy, because they were badly impacted with the presence of street vendors in front of their shops. Two customers who were fined USD 25 (the maximum fine is USD 80) showed their disagreement with the policy as they did not aware about the policy. They suggested Bandung City Government must replicate the policy of Jakarta in dealing with street vendors.



Figure 5: Designated Free-Street Vendors Zone. The Banner reads: Shopping at Street Vendors at Red Zone will be fined by maximum IDR 1 million (USD 80)

Source: Tempo.co

The mixed feeling of the respondents shows that the policy is not perfectly match with the present conditions. Unlike Jakarta, Bandung City's disincentive-to-customers policy is not equipped with comprehensive facilities plus incentive to street vendors. The street vendors are, by design, being neglected to gradually disappear because of zero demand. The zero demand leads to zero supply. Without sufficient incentive to the street vendors, this approach would only become a two-side-of-the-same-coin with disincentives to street vendors which commonly carried out by many city authorities in Indonesia.

CONCLUSIONS

Among four possible options to deal with persistent and exacerbating problems of street vendors, the disincentives-to-street-vendors is the most widely employed option for a number of reasons (1) the option is the easiest one to implement since the only requirements to implement the option are physical power and authority. Physical power is definitely abundant at the city government. So far, all city governments in Indonesia utilized a special police force under city government called *Satuan Polisi Pamong Praja* (Satpol PP), (2) The authority of the city government to exercise their power in dealing with street vendors, which is assigned by city regulation, is already in place. (3) Lack of innovative idea of the city government to exercise their power.

Learning from two different approaches, as exhibited by Jakarta's and Bandung's cases, incentive to both street vendors and customers is seemingly still the best option leading to permanent solution of the street vendors' issue. Disincentives would not work because of socio-economic conditions of the actors. Most actors, of both street vendors and customers, are socially disadvantage and economically underprivileged people. They are just implementing their constitutional rights to earn money, although at the wrong place. In the meantime, Government could not provide appropriate place for them to do business or provide sufficient formal jobs. This dilemma should actually be recognized by the city government to implement their policy on street vendors. Joko Widodo, the former Governor of Jakarta and Mayor of Surakarta acknowledged the situation and successfully managed the issues of street vendors in Surakarta and Jakarta. Although this model has not yet fully resolved the overall issues of the street vendors the present approach and ongoing process gives a better results towards comprehensive solution on the persistent problem of street vendors in most cities in Indonesia.

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PRESERVATION OF URBAN CULTURAL LANDSCAPE: CASE STUDY OF ROJI IN KAGURAZAKA, TOKYO

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Abstract

The Landscape Law, introduced in Japan in 2004, has granted the municipal governments the regulatory power to protect cultural landscape they wish to preserve. Due to its wider coverage, the law can technically protect the landscape developed through the secondary and tertiary industries, which theoretically includes the urban cultural landscape. However, until today, no significant cultural landscape is officially designated in its capital city Tokyo, although, such urban neighborhoods with historic sense of place still exist and are highly appreciated. By examining the fifteen-year community's effort to preserve roji (alleys) and its landscape in Kagurazaka in central Tokyo as a case study, this paper aims to examine the achievement and limitation of the community's advocacy efforts. In conclusion, this urban community has rather viewed its landscape as a favorable living environment than cultural resources, while the academic research recognized it as historic resource and urban cultural landscape. To better preserve the urban landscape as living environment with authenticity of the place, two approaches need to be combined in the future.

Keyword: urban cultural landscape; historic preservation; urban conservation; town planning; Tokyo; Kagurazaka

INTRODUCTION

In Japan, since 2004, cultural landscape has been added to the menus of cultural resources by the amendments to the Preservation Law of Cultural Properties. The Landscape Law was created for this purpose and has enabled the municipal governments to regulate the development in and around the cultural landscape that they wish to preserve. In general, in the global context such as UNESCO, the concept of cultural landscape itself is significant in that it is able to evaluate the historic landscape by focusing on the interactive place making process of human beings and its surrounding nature. Historic buildings or structures are not necessarily the prerequisite to be designated as cultural landscape, which will give greater flexibilities for the cultural and historic resources. The Japanese concept of cultural landscape is even more comprehensive, as it also includes the characteristic landscape that was created through the continuous life styles and vocation of the human beings. Due to its broader definition, not only the rural landscape of agriculture and fishery but also the landscape created through the secondary

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manufacturing and tertiary industry can be eligible for it. Hence, this expanded concept of Japanese cultural landscape technically enables the designation of urban cultural landscape, which is not lined up with vernacular architecture with distinctive styles. This theoretically allows the urban areas of Japan such as Tokyo, where historic buildings do not survive as a group to constitute unique townscape due to the war disaster or sudden urbanization after the WWII, to recognize the landscape that people have attachment to and want to protect.

In reality, however, after ten years have passed since the introduction of cultural landscape, no significant cultural landscape is designated in its capital city Tokyo, although there are some old urban neighborhoods that still retain the trace of older development pattern and therefore historic sense of place, which was created through an urban life style or industry and are highly appreciated by the local people and city tourists.

By examining the roji (alleys) and its cultural landscape in Kagurazaka, which was developed by Geisha industry (also called Karyukai)¹ in the central part of Tokyo as a case study, this paper aims to examine how the fifteen-year community's effort to preserve its unique landscape benefited its town planning but not led to the designation and stronger protection of cultural landscape. As a result, I would like to obtain implications for Kagurazaka and similar urban neighborhood to be protected as an urban cultural neighborhood.

TRANSITION OF KAGURAZAKA AFTER THE BEGINNING OF THE 21ST CENTURY

Roji as a Historic Layer to the Older Urban Structure of Kagurazaka

Located in the central part of Tokyo (Figure 1), Kagurazaka has been the commercial and residential neighborhood since late nineteenth century (Figure 2) and known for its main street and the organic network of roji in the Geisha quarters. Kagurazaka is one of the few remaining Geisha areas in Tokyo. Its population is approximately 2,600 and the size of the area is sixteen ha.

Roji itself is a general term to describe a narrow street, which is normally two to three meter wide, and developed as a private street. Roji was quite ubiquitous in any Japanese cities during twentieth century, but gradually disappeared, as the very narrowness of roji does not meet the post-war city planning system, which requires any road to be more than four meter for the sake of fire trucks.

¹ The geishas are the bearer of the traditional Japanese performing arts such as dancing, singing and playing traditional instrument called shamisen. They belong to the Okiya and are dispatched to Ryotei (restaurant and venue for the dinner party). Business owners of Okiya and Ryotei have formed the guild and it has still survived in Kagurazaka. Geisha industry is also called Karyukai in Japanese, which means "the world of flowers and willows," and it was derived from the poet Li Po of the T'ang dynasty in China, who compared the beauty of the women in the pleasure quarters to the flowers and willows.

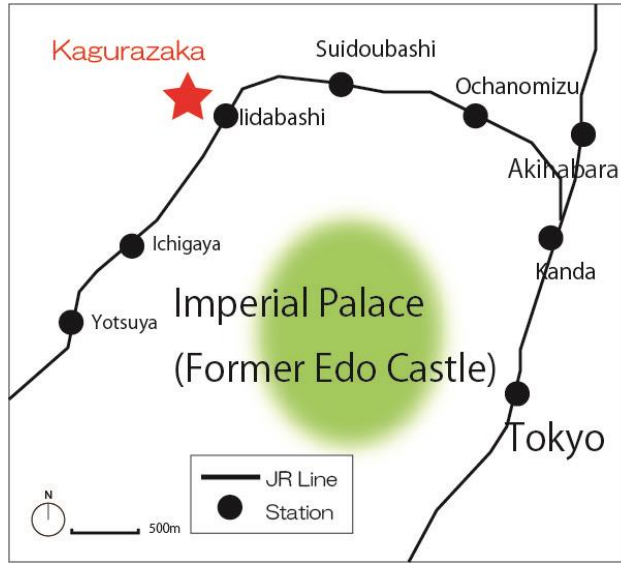


Figure 1: Location of Kagurazaka in Central Tokyo

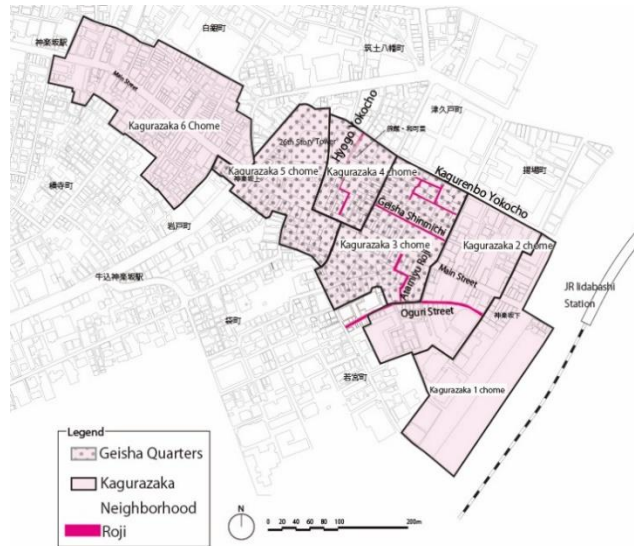


Figure 2: Map of Kagurazaka Neighborhood

Source: Kagurazaka Team of the Urban Design Laboratory at the University of Tokyo, 2012, partially revised by author

The network of roji that are seen in Kagurazaka neighborhood today was developed on top of the earlier structure, which was created during the Edo Period, starting in the early seventeenth century. The area was originally developed as a residential neighborhood for the high-class warriors due to the proximity to the Edo

Castle. Most of the major streets that define the structure of today's Kagurazaka dates back to this era (Figure 3). Later in the Meiji Period, when the Emperor took over the government from Tokugawa Shogunate in 1867, these warriors were evicted and the entire neighborhood was converted into commercial and entertainment district. Geisha industry, which has made Kagurazaka famous, originally started to appear in the late Edo Period (mid-nineteenth century) and started to flourish during the Meiji Period. Rojis were developed through the subdivision of the lots within the city blocks, which are bounded by the arterial streets that were developed during the Edo period. Therefore, roji in Kagurazaka itself is one of the historic layers added to the neighborhood.

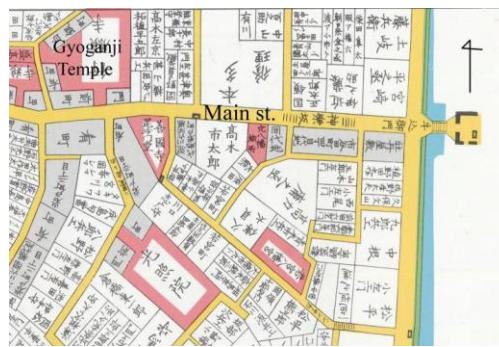


Figure 3: Map of 1871. Streets in yellow in the map are still recognized in current structure of the neighbourhood.

Source: Shinjuku Educational Board ed. *Map collection of Shinjuku Ward*. 1979. (English caption was added by the author.)

Threat to the Roji: Surge of Urban Living Trend onto Kagurazaka Neighborhood

Kagurazaka has started to experience several changes around the turn of the century. Due to its proximity to the central business districts such as Shinjuku and Otemachi, and the affordable land price during the recession after the burst of Bubble Economy, Kagurazaka and its surrounding areas have started to attract the residential development. The speed of development of residential buildings with three stories or taller was accelerated since late 1990s (Kagurazaka Team of the Urban Design Laboratory at the University of Tokyo, 2012). Such new developments were mostly seen in the vicinity of Kagurazaka boundary, but the low-scale of Kagurazaka neighborhood was not largely affected during 1990s. However, it was the development plan of the 31st story residential tower in the former roji quarters that made the local community and the fans of Kagurazaka realized the vulnerability of their everyday landscape with a sense of crisis and significance of roji for the first time (Yamashita, 2007). Geisha industry in Kagurazaka started to decline due to the recession and several business owners closed the business. Seeing this difficult business climate, most of their children did not inherit their family business and left Kagurazaka by selling the properties to the developers to pay for the high inheritance tax in the urban areas. In 1950 there were more than eighty Geisha businesses and 200 Geishas in Kagurazaka, but during the first decade of the 21st century, the number of

establishments and that of Geishas reduced to nine and thirty respectively. The decline of Geisha industry meant the loss of bearer of the landscape of roji quarters in Kagurazaka. Finding out that this development would be visually obtrusive and negatively affect the traditionally low-scale landscape of the neighborhood, the local community of residents and business owners formed the group, partnering with legal, city planning and urban design experts to protest the development and continued negotiated the possibility to scale down to the harmonious development with the developer. Although the developer decided to lower the building height to 26th story, it never met the way that the local people expected to see. The tower was completed in 2003 (Figure 4).



Figure 4: 26th Residential Tower: (Left) View from the arterial road (Right) View from roji

Rejuvenation of Kagurazaka after the Defeat of the Battle with the Developer

This defeat made the community realized the significance of roji and the landscape to their neighborhood and necessity to protect it, while allowing the harmonious new development. It led them to realize the necessity to apply the city planning tool to achieve their purpose. Voices of the community were led to the creation of some special groups. The special organization called Machizukuri Koryuukai, which consists of the local residents and business owners were established to introduce the district plan whose purpose is to regulate the height of new development in the roji quarters as a first step to control the development. Additionally in 2003, the not for profit organization called Ikimachi Club was launched, which consists of not only the direct stakeholders of the neighborhood, but also those who appreciated the old ambience of Kagurazaka. Ikimachi Club played a significant role to revitalize the neighborhood by providing the opportunities for the community and those who are interested in it outside of Kagurazaka

to investigate not only the tangible assets such as roji and old establishments in the neighborhood by holding the walking tour and roji symposium, but also the life and culture of the neighborhood life by resuming Yose events (performances including comedy, music, and magic shows) and by providing lecture on the old music performance that used to be held in Kagurazaka. All these efforts started to capture the eyes of the public and Kagurazaka started to be featured in several books and magazines as well as TV programs as a destination which has historic sense of place. After fifteen years of community's effort to investigate their assets and to advocate its special characters to the larger audience beyond the neighborhood, Kagurazaka has changed from the rather quiet and mundane commercial area for the local people to the vibrant urban destination that even attracts the tourists from the other part of the country. The reputation of Kagurazaka as the town of old Japanese ambience attracted new business owners who are sympathetic to the brand that Kagurazaka now carries and some even adoptively reuse the former Ryotei (restaurant that provides dinner to the clients and where Geishas show their performance) buildings into new bars and restaurants. In the end, Kagurazaka community has turned the crisis of its landscape into the opportunity to successfully rebrand their neighborhood by figuring out the values of their unique urban landscape and the activities that have been accumulated over time and affected the characteristic landscape.

INCREASE IN INTEREST IN ROJI NATIONWIDE

Value of Roji within Today's Context

Roji has had negative connotation for a long time in Japan, as it does not meet the current planning system whose main purpose is to build fireproof cities and efficient use of land by building taller structures. The neighborhoods with roji have been considered to be vulnerable for fire as it cannot accommodate the fire trucks and these densely built, old wooden buildings along rojis were targets of renewal. However, around the beginning of the twenty-first century, roji and its built environment has started to gain positive appreciation. Several books and articles, which discussed the benefit of roji started to be published. As Nishimura (Nishimura 2006) indicates, this revaluation of roji throughout Japan should be regarded as the people's adverse claim to the post war city planning system, which is uniform and efficiency oriented as the city planning system in the twenty-century was mostly designed to serve the automobiles, not human beings.

Within this discussion on roji, roji is recognized as the locus of the neighborhood life. Particularly within the residential neighborhood, roji has served as a common open space for the housewives who live there to chat during the day. For children, roji, which is free of automobiles, is a safe playground. Hence, roji has been always recognized as a place of daily activities. In the commercial quarters, roji functions as an urban mechanism to create the vibrant atmosphere, by concentrating human traffic into the limited space, whose narrowness is highlighted by the wall of the shops on the edges of roji.

The other notable value that the people find in roji is that it provides the human-scale space. As Nishimura (Nishimura 2006) points out, roji was designed to serve the pedestrians and therefore its scale matches that of human beings, which is favored by the people in the twenty-first century who find it comfortable as an urban space.

It should be also pointed out that due to the involvement of the professionals of urban planning, architecture and urban design, roji has started to be recognized as the object of scholarly works, beyond the nostalgia.

Nationwide Movement to Reevaluate Roji in Urban Settings

Respect and preservation effort for roji was also seen in the several urban neighborhoods in the country such as Kyoto and Osaka. Several organizations to advocate for the roji were launched in the other cities as well. These several movements were culminated into the launch of the nationwide organization called National Liaison Council of the Neighborhood with Roji in 2004, to advocate the necessity to preserve roji while rejuvenating and upgrading its built environment. The organization holds Roji Summit every year and it has helped concerned parties to exchange ideas to preserve roji with current planning tools and to advocate the value of roji to the public. Kagurazaka was one of the earlier members of the council and helped lead the initiative.

SEVERAL VALUES FOUND IN ROJI BY THE DIFFERENT STAKEHOLDERS

Although the interest in roji has significantly increased, it does not necessarily mean that every stakeholder have found the same value to the roji and its landscape. For the long time residents, who spent their childhood there and used roji as a play ground for hide and seek values roji as a safe and human scale living environment and likes the cleanliness of the roji which are maintained by the continuous use by the shops and residents¹. For the tenants who run the restaurants and shops in the roji quarters, its quiet hidden location enhances the image of their business². On the other hand, some property owners clearly showed their willingness to maximum financial benefit allowed as of right. Even after the roji has got public interest and attracted city tourists, out of scale development has occurred in and around roji quarters. In 2006, the owner of the property, which did not directly face to the roji but quite close to the roji, built the fourteen story residential buildings, which was considered to be out of scale to the roji quarters despite the strong opposition by the group of pro-roji people. In 2008, four contiguous lots in the roji quarters were merged into one, and five story commercial buildings were built, whose massing and height stands out in the low-scale neighborhood, but tried to show the visual connection to the roji quarters by installing black walls and stone pavement, which are often seen.

ROJI AS HISTORIC RESOURCE AND URBAN CULTURAL LANDSCAPE

Roji as a Historic Resource

There are some academic approach trying to evaluate roji as cultural and historic asset by the preservation and planning expertise to explore the authenticity of this new historic

¹ Comments made by Osamu Yamashita in the newspaper article dated on June 19th, 2001. (The name of the newspaper is not identified.)

² In the website of the restaurant Kamikura, which adaptively reuses one of the former Ryotei building in the roji quarter, it advertise the restaurant as the hidden place with old Japanese ambience.

resource and landscape. According to Matsui and Kubota, who traced the major remaining rojis from the late Edo period to 2011 by using historic maps, roji was developed gradually within the Geisha industry quarters as the new buildings were constructed and the overall configuration of the major rojis can be recognized in the map of 1937 (Figure 5).

The fact that Kagurazaka was burnt down during the war and no pre-war buildings survived in the entire neighborhood makes these street patterns of roji as significant historic resources. Although no precedent of designation of historic street pattern or roji itself as a cultural property in Japan, there are some cities in the world that have acknowledged the significance of historic street pattern as a cultural resource. In New York City, where the development pressure is also high like Tokyo, they have protected the organic street pattern of Colonial New York by designating it as New York City landmark just like the buildings and historic district, since this street pattern is practically the only evidence on the ground in Manhattan that survived from the seventeenth century (New York City Landmarks Preservation Commission 1983). Its significance was particularly recognized as only a few buildings from seventeenth and eighteenth centuries have survived in entire city due to the continuous development (Shockley 2007). The designation of the historic street pattern as cultural resource prevents the removal of the street by merging the adjacent lots together and relocating it to build massive structures (Morokuma 2007). In the case of Kagurazaka, this justification could be also applied not only to protect the street pattern itself but also to prevent the possibility to allow developers merge several small plots along roji to develop the out of scale high-rise tower in the future.

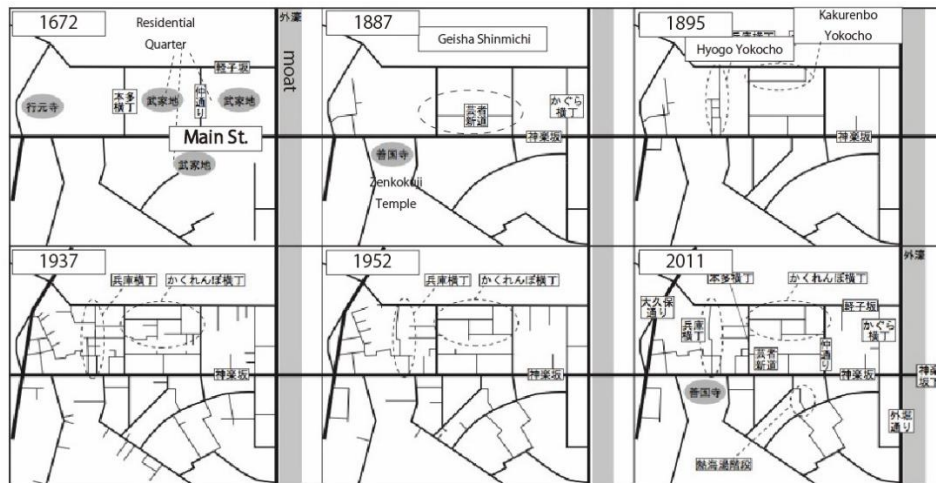


Figure 5: Development of Roji Network

Source: Matsui and Kubota, 2012 (English captions area added by the author)

Landscape of Roji

Although buildings along roji which were reconstructed to serve as Karyukai business were more than fifty years old and eligible for historic properties, majority of them were

not considered to be worthy of preservation but one¹. It was probably due to the fact that the Geisha business owners had to reconstruct their buildings with the limited resources during the time when the building materials were scarce to resume the business as soon as possible. Also as the interview with Mr. Shibuya who was the owner of the Ryotei Chigetsu in 2007 indicates the interior space was more important and thus more resources were allocated to create the elaborate interior space for their clients to enjoy the dinner and entertainment by Geisha (Shibuya 2007). Just like the buildings, other materials that contributed to the characteristic roji streetscape does not have authenticity in the materials, but when collectively seen, there is a characteristic landscape within the roji quarters.

Study of widely recognized rojis such as Kakurenbo Yokocho and Hyogo Yokocho and other shorter rojis in the area indicates some physical characters and components that persist in the roji and its landscape. The major components of roji and landscapes are stone paving, tall walls, greenery and two-story buildings. The roji, together with these contributing components create the container like space filled with greenery (Figure 6).

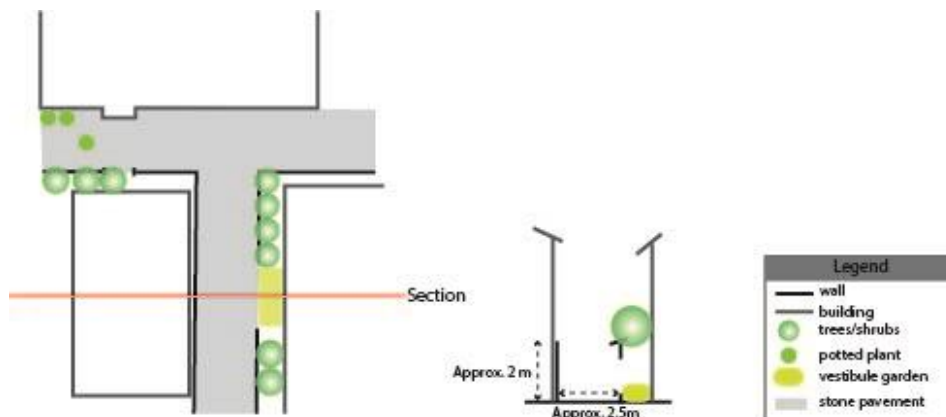


Figure 6: Site plan and section of the part of Kakurenbo Yokocho

First of all, the very narrowness of roji is highlighted by the tall fences or walls of the buildings along roji. Either a fence which is as tall as approximately two meters or the exterior wall of the buildings stand at both sides of the edge of the roji. Although built by each owner of the properties, these fences and walls located on the edge of the roji create the continuous streetwall and provide the cohesive look for the clients of Geisha and passers-by as a neighborhood and remind them of the narrowness of the roji (Figure 7).

Second, the roji is usually paved with stone materials (Figure 8). The most common paving material is Pinkoro stone, which is 9 x 9 cm each, and laid out in a shape of fan. Some roji in Karyukai is paved with slabs of stones which provides the different appearance from Pinkoro stone. According to one of the old residents in Kagurazka, who spent his childhood right after the war, the roji was paved with slab of stone and did not

¹ One former Ryotei building (completed in 1950) was later listed on national register, but this building does not face the roji.

look as fancy as it is now. The old photo which is said to be taken in the late 1940 shows one of the rojis in Kagurazaka without paving.



Figure 7: Streetwall by the continuous tall fences



Figure 8: Types of Stone Pavements seen in Kagurazaka (Left is the Pinkoro pavement)

Greenery is also an element that is often seen in the streetscape of roji. Some buildings along roji have a vestibule garden between the edge of the roji and entrance of the buildings. In the garden, the shrubs or flowers are recognized. In other cases, the trees are planted behind the tall walls and seen from the street level. On some parts of the rojis, potted plants are placed by the occupants of the buildings, which are also not the special practice to Kagurazaka but is often seen in the densely built residential areas.

Although there are not many, some academic approaches to associate this characteristic landscape with the Geisha industry, which originally developed this area, exist. Matsui and Kubota, through the research and analysis of twenty remaining Karyukai related buildings in the roji quarters, particularly focusing on the arrangement pattern of the buildings, point out that clear relationship between the buildings and roji and its association with the business practice of Karyukai industry (Matsui and Kubota, 2012). According to their findings, seventeen out of twenty buildings have the buffer zone between the edge of the roji and the entrance to the buildings, which are sometimes used as a garden. Matsui further indicates that this arrangement was developed in the densely built Karyukai so that their clients did not have to see each other, and also analyzed that tall walls, sliding doors and decorative lighting fixtures around this buffer zone was the Karyukai's intention to connect the roji and the buildings.

In 2010, the Agency for Cultural Affairs, government of Japan, in its attempt to list the potential cultural landscape of the second and tertiary industries in Japan, Kagurazaka is selected as the area to be investigated further. Although the agency evaluates the entire Kagurazaka, it mentions the relationship between the landscape of roji quarters and Geisha industry briefly (Agency for Cultural Affairs, Government of Japan, 2010).

As discussed before, when evaluating roji and its landscape in Kagurazaka from the historic preservation point of view, street pattern which dates back to 1930s and landscape of roji can be seen as the cultural landscape that was created through the Geisha industry. There was a restriction on the Geisha business regarding where to be operated before the war. The maps of 1937 and 1952 (Figure 9) which show the high density of Karyukai related buildings in the back side of the main street, where they were allowed to operate, and the fact that the Karyukai industry was booming with the growth of Japanese economy, the roji was used as a way to utilize the unused back lot so that Karyukai continued to thrive. Hence, roji and its cultural landscape was created through the needs of Karyukai in Kagurazaka and its landscape was inherited through the Karyukai use or similar use like restaurants and bars until today.



Figure 9: Concentration of Karukai Related Buildings in the Roji Quarters in 1937 and 1952

Source: Kagurazaka Team of the Urban Design Laboratory at the University of Tokyo, 2012 (revision of colors was made by the author.)

HOW TO PRESERVE ROJI AND ITS LANDSCAPE

Potential Tools to Preserve Roji and Its Cultural Landscapes

In order to preserve roji and its cultural landscape, several measures need to be applied. As discussed earlier, preservation of roji requires the preservation of the width of the roji and its street pattern of 1930s, which is still mostly recognized today and its significance should be enhanced by the fact that no historic buildings survived from the pre-war era. To preserve the landscape of roji, it is also required to control the new development in the roji quarters, as the space created by the interaction of roji and the adjacent buildings is recognized as significant landscape. Considering the facts that the buildings along rojis

do not have long durability as they were built right after the war, where the construction materials were scarce, and aesthetic or architectural values of existing Karyukai buildings are not recognized fully, renewal of the buildings is inevitable.

Preservation of the width of roji can be achieved by the planning tools (Paragraph 3 Street system and the Design System for Continuous Buildings), preservation of the street pattern of 1930s by the preservation tools (designation of historic street pattern as cultural property or as the contributing elements of the Preservation District for the Groups of Traditional Buildings). New development along roji can be controlled by the District Plan and Landscape Guideline by the municipal government.

Gaps between the Residents and Preservation and Planning Professionals on the Future of Roji

Although the residents have acknowledged some historic and cultural values of roji and its landscape, there is a gap between the primary values of roji for the residents or business owners and those for the planning and preservation expertise. The views of roji from historic preservation point of view were not necessarily the central argument of the community of Kagurazaka to preserve roji. Rather, from the beginning, they pay more attention to preserve the human scale living environment created around roji and appropriate balance between the existing low scale quarters of roji and new infill development¹. Particularly for the long time residents, roji and its landscape has gradually changed to meet the needs of the occupants at the time. As pointed out in the Chapter four, the paving of roji was changed to Pinkoro stone at some point after the war, and its paving itself is not unique to Kagurazaka. Some of the walls in the roji quarters were made of concrete blocks, which are common building materials. For the residents in the neighborhood, the cultural landscape of roji was rather part of their daily landscape.

What Can be Protected?

Current Status of the Land Use Control over Roji and its Cultural Landscape

Currently in Kagurazaka, the District Plan, which regulates the height of the new development in the roji quarters and the minimum lot size, and the Landscape Guideline, which projects the preferable image created through the new development, have been introduced.

District Plan

District Plan is a planning tool that has been widely used to regulate the new development in a designated area. The district plan allows a municipal government to create its own development rules. Additionally, the district plan system requires the municipality to include input from local residents, and the local community itself can start the process². In Kagurazaka, despite the necessity to introduce district plan to prevent the out of scale development since 2000, it took seven more years to do so to reach the agreement. Although in the plan, it recognize roji and its landscape is a symbol of the neighborhood and its streetscape to be preserved, the restrictions on roji areas do not necessarily lead

¹ The result of the questionnaires to the residents on the proposed 31st high-rise residential development, dated July 2000, indicates that 94% of the survey respondents agreed that the height of the building was not accepted and several concerns were presented to the existing low scale landscape of Kagurazaka by the proposed development.

² If the residents propose the creation, two-thirds of the property owners' consent is necessary.

the harmonious development of the existing landscape of the area, since it only regulates the height limit of twenty-one meter and minimum size of the plot (65m²). In the roji areas where most of the old structures along roji are two-story, 21 meter is equivalent to seven stories and still too high. The new development, which was done prior to the district plan, is a five-story building, but it still breaks the visual sequence of the low-scale neighborhood. The qualities of roji space discussed as the elements of cultural landscape of roji space cannot be recreated in reconstruction of the buildings along roji by this limited district plan.

Landscape Guideline

Since the introduction of the Landscape Law in 2004, municipal governments are able to create its own landscape plan to indicate the basic standard of the landscape, which will be achieved through the new development and preservation of the existing built environment with good landscape. Shinjuku Ward has also introduced its own landscape law since 2009, and designated Kagurazaka as one of six special districts, which needs the special standard for landscape. By its landscape law and corresponding development guideline, Shinjuku tries to replicate the quality of the space in the roji quarters of Kagurazaka, which are often recognized in the roji and its landscape. In this guideline, the use of the stone paving, tall walls in dark colors, use of the Japanese style design and muted colors, which are often found in roji quarters, are indicated as the encouraged standard of the new development particularly along roji. The standard will help applicants of new building construction to understand the characters of the neighborhood to some extent and encourage them to observe the context. However, this standard does not have legal binding force and the building permit can be technically issued to the applicants, who do not follow the standard.

CONCLUSION

The sudden threat to the everyday landscape of the old urban neighborhood in Tokyo, which had not been recognized as a typical historic district due to the lack of concentration of historic buildings, led the community to realize that the roji and its landscape are the significant asset of their neighborhood and they could be the basis for the future town planning that will enhance its unique characters of Kagurazaka. Significance of roji and its landscape as a regional asset was agreed by several stakeholders and its preservation is clearly stipulated in the municipality's plan as an overall goal, it has been rather seen as a living environment but not so much as historic resources by the community who are the major actors of town planning. Due to the loose application of the planning tools and no use of preservation tools, preservation of roji and the contextual new development within the roji quarters are not guaranteed fully at this point. Significance of roji as a cultural landscape has been acknowledged in the academic field, but it is not widely accepted by the residents of the neighborhood and thus does not constitute a strong advocacy for the municipalities. The preservation of the urban cultural landscape and preservation of safe and livable living environment, which has been nurtured and inherited in the same place, needs to be considered together. Particularly, the fact that the urban cultural landscape of roji which carries the sense of place of the recent past has been still readable within the ever-changing Tokyo without formal protective tools for a long time may indicate that other mechanism such as the mixture of residential and

commercial uses in the roji areas might contribute to the preservation of such urban cultural landscape even after most of the original occupants of the buildings left the quarters. To find out this mechanism, further research is necessary to figure out how the roji quarters were used and maintained by the non-Karyukai occupants after most of the original use of the quarters was lost.

ACKNOWLEDGEMENT

This paper is based on the research that I conducted for the master's thesis for the Graduate School of Architecture, Planning and Preservation, Columbia University in 2007. I would like to thank Mr. Kaoru Yamashita, who was the secretary of general of the Ikimachi Club in Kagurazaka, who has helped me obtain the relevant information, introduced the concerned people in the community and above anything else, led me understand the special characters of Kagurazaka.

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COMMUNITY PERCEPTION OF MANAGEMENT GOALS IN MATOUSHAN NATIONAL NATURE RESERVE

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Abstract

National nature reserve (NNR) is the important ecological baseline of the ecosystem security of the country. However, it is under the pressure of mass tourism, low participation of local community, and improper management. It is a matter of great urgency to determine strategies and tools in support of the balance between conservation and development of NNR. At present, the management system of NNR in China is a system where the country supervises and the local government manages. The perception of the NNR's management aim has direct influence on the management efficiency and protection effect. In this paper, the issue with Matoushan National Nature Reserve in Jiangxi Province has been analyzed as an example. Local residents and administrators' attitudes and perceptions of the management goals of the NNR were measured from three aspects: (1) response to current policies practiced in the reserve; (2) degrees of perception of community co-management; (3) expectation for future development of the reserve. Based on the measurement of community attitude and intention toward four dimensions of ecotourism and assessment of the values and current threats to Matoushan NNR, five sustainable development strategies have been put forward which involve ecological conservation and recovery, local culture revitalization, industry and program planning, educational tourism planning, and periphery development and management. Seeing the resources inside the reserve areas as a natural, cultural, social and economic asset, ecotourism planning is holistic by integrating the goals of natural resources conservation and those of social and economic improvement in revitalizing and managing NNR.

Keyword: Community Perception, Management Goal, National Nature Reserve, Planning Methodology, Sustainable Development

INTRODUCTION

Since the nature reserve is in a long-term interdependence relation with residents of neighborhood, the support from local residents is directly related to the proper management of it. By stakeholders analysis, including those who affect or are affected by a decision or an action (Freeman, 1984), implementation and assessment of outcomes will be improved (Grimble & Wellard, 1997). There are about 30 to 60 million people live in and around China's reserves (D. Q. Zhou & Edward Grumbine, 2011). Since, society and landscape are the result of a dynamic exchange process between the individuals and their

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environment, a sustainable landscape development should guarantee that the residents can participate in their everyday landscape (Buchecker et al., 2003).

Since the 1970s, many researchers and international organizations have devoted to the topic on how to coordinate relation between a nature reserve and neighborhood residents and come up with a series of coordination mechanism, such as the concept of biosphere reserve (Price, 2002; Price et al., 2010; Reed & Egonyu, 2013), comprehensive protection and development projects, and community co-management. All of them are common in that both of protection and development are included into functions of a nature reserve. As with management, they stress community participation and represent fairness and respect to local residents.

Currently, China remains at primary stage regarding construction and management of nature reserves. Though the number of nature reserves is being extended quickly, the improvement of quality is relatively lagging behind (D. Zhou et al., 2014). Community residents and managers, as objects and primary participants of conservation area management (Grimble & Wellard, 1997), will directly affect the implementation effect of nature reserve policies. Koorosh et al. (2015) proposed a indicator-based approach for the subjective evaluation of participation including the process and the outcome. This paper, by taking Matoushan National Nature Reserve as a case, analyzed community residents' and managers' perception of management aim in order to: (1) identify the differences between the community residents and managers' response to nature reserve policies; (2) analyze the key factors that affect the relation between community and NNR; (3) discuss effective ways for improving the relation.

RESEARCH METHODS

Through literature analysis, field investigation, questionnaire survey, conversation with managers, and expert interview, this paper has made a primary research of community perception of the goals of nature reserve management. The research data are attained through a questionnaire survey and objects of the survey are social residents who are above 18 in Matoushan NNR and managers of local Agricultural Bureau, Forestry Bureau and Land Resources Bureau. Content of the questionnaire is consisting of three parts: (1) response to current policies practiced in the reserve; (2) degrees of perception of community co-management; (3) expectation for future development of the reserve.

As with the questions, there are closed and open questions: the closed questions facilitate the attainment of data for statistical research and analysis of cognition attitudes of community residents and managers towards the reserve. Collection of data of this research was completed in March of 2013. In total, 31 effective questionnaires were attained (8 are manager questionnaires). The site of community resident survey was in a house of peasant household while that of manager survey was in local government department. Data processing was completed by making use of frequencies, descriptive, cross tables, independent-samples T test module of SPSS 19.0 software.

RESEARCH FINDINGS

Response to Current Policies in the Reserve

More than half of the residents are not benefiting from, and unsatisfied with the current policies

Grimble and Wellard (1997) implied that natural resource always have multi-users who are not be compatible, taking forest and tree resources as example. According to the survey of satisfaction with current policies in the nature reserve, 13.0% of the community residents are satisfied with current policies, 65.2% of the residents have not benefited from and got damaged by current policies and 21.7% of the residents think use restrictions on lumbering have caused great influence on their life and show dissatisfaction. On the other hand, managers primarily hold positive or neutral attitude towards current policies. After natural resources with protective value are included into the reserve according to relevant laws and regulations, some original sources of production and life of community residents are cut off. Though community residents can directly or indirectly have some incomes through participating in ecological agriculture and tourism operation after the establishment of the reserve, the major income of the nature reserve is still in general attained by external public, which consequently generate passive mood towards the reserve in the community.

Life problems like poor living conditions and employment difficulty are prevailing among the residents

Table 1: Current living states of community residents

		Residents		Managers		T-Test	
		Count	Percentage	Count	Percentages	t	P
Poor living conditions	Yes	10	43.5%	2	25.0%	0.91	0.37
	No	13	56.5%	6	75.0%		
Difficult employment	Yes	10	43.5%	2	25.0%	0.91	0.37
	No	13	56.5%	6	75.0%		
Difficult schooling	Yes	10	43.5%	3	37.5%	0.29	0.78
	No	13	56.5%	5	62.5%		
Poor medical conditions	Yes	11	47.8%	4	50.0%	0.10	0.92
	No	12	52.2%	4	50.0%		

So far as current living state concerned, the community residents are holding different attitudes towards living conditions, employment issue, schooling issue and medical conditions (Table 1). In the process of the survey, the author discovered that the traffic for residents living in Matoushan, Gangxi village and Gangbian village is inconvenient; moreover, the residents generally said that the schooling is difficult and the medical conditions are poor. As a matter of fact, those problems are universal in all nature reserves in China. The community residents are living in rural mountain areas and the living conditions there are poor. Besides that, the roads to natural villages in the reserve are primarily dirt roads, and as a result of which, traffic is inconvenient and material

circulation is difficult. All of above have largely restricted economic development of the reserve and surrounding communities and caused much inconvenience for the residents.

Most residents hope to improve life through tourism development of the reserve which may provide more jobs

Table 2: Future policy preferences

		Residents		Managers		T-Test	
		Count	Percentage	Count	Percentages	t	P
Provide jobs	Yes	12	52.2%	5	62.5%	0.49	0.63
	No	11	47.8%	3	37.5%		
Promote tourism development	Yes	19	82.6%	7	87.5%	0.31	0.76
	No	4	17.4%	1	12.5%		
Improve education	Yes	4	17.4%	3	37.5%	1.16	0.26
	No	19	82.6%	5	62.5%		
Provide technical training	Yes	3	13.0%	5	62.5%	3.06	<0.01
	No	20	87.0%	3	37.5%		
Farmland improvement	Yes	2	8.7%	1	12.5%	0.30	0.76
	No	21	91.3%	7	87.5%		

According to an analysis of the residents' future life development policies, promoting tourism development (t=0.31, p=0.76) and providing jobs (t=0.49, p=0.63) are very important to promote development of the reserve from perspectives of both residents and managers. On the other hand, the limited farmland is difficult to meet settlement of family labors and improvement of economic conditions. Both parties agree that farmland improvement is high in cost while limited in development potential. Consequently, they are holding negative attitude towards farmland improvement (t=0.30, p=0.76).

In terms of providing technical training, the managers and community residents are varying in idea (t=3.06, p<0.01). The community residents, who are not interested in technical training in the level of development policies, hope the managers will directly provide economic benefits so as to promote development of the reserve.

Degrees of Perception of Community Co-management

More than half of the residents have no idea of community co-management while the managers have a higher degree of perception

Table 3: Perception of community co-management

		Do not know	Have heard of it but do not understand	Know but do not care	Know and participate
		Residents	Count	15	4
	Percentage	65.2%	17.4%	13.0%	4.3%
Managers	Count	2	3	2	1
	Percentage	25.0%	37.5%	25.0%	12.5%

Community residents' and managers' degrees of perception of community co-management are shown in Table 3. As with knowledge related to community co-management and its specific significance, 4.3% of the residents know it and will participate in actively, 13.0% of the residents know but do not care while 65.2% of the residents do not know it. In comparison, the managers have a higher degree of cognition of community co-management (mean equation t test: $t=-2.53$, $df=30$, $Sig.=0.017$, $p<0.05$), with 25.0% of the managers knowing but do not care it and 12.5% of the managers knowing it and will actively participate in it. Policies on community participation need to be further promoted among community residents.

The community residents care more about development and improvement of life while the managers care more about continuity of traditional industry culture.

In the community co-management part of the questionnaire, four questions (planting industry, breeding industry, ecological tourism industry, and hydropower and transportation industry) are presented to know the residents' and managers' attitudes towards key development projects and aiding projects. In it, "the most important" is rated 5 points, "relative important" 4 points, "common" 3 points, "less important" 2 points and "not important" 1 point; an average mean of Likert scale that lies between 3.5 and 5 means important, between 2.5 and 3.4 means common and between 1 and 2.4 means not important. Analysis result of the survey data is shown as following:

Table 4: Residents' preferences of key development projects regarding community co-management

Project Content	Residents			Managers			T-Test	
	Mean	Std. Dev	Approv al Rate	Mean	Std. Dev	Approv al Rate	t	P
Planting industry	2.74	0.75	8.7%	4.13	0.99	62.5%	4.13	<0.001
Breeding industry	2.43	0.79	4.3%	3.13	1.13	25.0%	1.91	0.06
Ecological tourism	4.35	1.07	87.0%	4.63	0.52	100.0%	0.70	0.49
Transportation and hydropower	3.57	0.99	39.1%	3.13	0.99	25.0%	1.08	0.29

As shown in Table 4, the community residents and managers have a common view regarding developing ecological tourism and their rates of approval are 87.0% and 100.0% respectively. Meanwhile, both community residents and managers hope to change current living state through developing tourism. As with other three projects, the community residents have a strong appeal for developing transportation and hydropower (the mean value is 3.57 and the rate of approval is 39.1%) while the managers prefer to develop planting industry (the mean value is 4.13 and the rate of approval is 62.5%) while hoping that traditional industries like farming will be continued in the nature reserve. During the survey, however, we got to know that the only a few community residents are engaging in farming and the per capita cultivated land is very small. Consequently, the community residents regard developing planting industry has little relation to their life quality. On the other hand, infrastructure, especially development of transportation, directly affects their degrees of contacting the outside world. Therefore, the community residents hope to benefit from developing infrastructure.

Table 5: Resident aiding projects regarding community co-management

Project Content	Residents			Managers			T-Test	
	Mean	Std. Dev	Approval Rate	Mean	Std. Dev	Approval Rate	t	P
Direct funding	4.26	0.86	82.6%	4.50	0.76	87.5%	0.69	0.49
Technical aiding	3.00	1.09	26.1%	4.00	0.54	87.5%	2.48	<0.05
Preferential policies	3.87	0.87	65.2%	4.25	1.04	87.5%	1.02	0.32

In addition to that, we can see from statistics of residents' preferences for aiding projects (Table 5) that both community residents and managers agree the form of direct funding (rates of approval are 82.6% and 87.5% respectively); as with technical information aiding ($t=2.48$, $p<0.05$), the rate of approval of community residents is 26.1% only (that of managers is 87.5%), which means the community residents prefer direct capital aiding and preferential policies.

Expectation for Future Development of the Reserve

Community residents and managers are greatly varying from each other regarding cognition of out-migration for work and immigration (moving out of the reserve)

Table 6: Policies for developing the residents' life

Content	Residents			Managers			T-Test	
	Mean	Std. Dev	Approval Rate	Mean	Std. Dev	Approval Rate	t	P
Immigration	2.74	1.32	17.4%	4.00	1.41	75.0%	2.28	<0.05
Out-migration for work	3.52	1.20	47.8%	2.38	1.06	12.5%	2.39	<0.05
Engage in tourism industry	4.74	0.69	95.7%	4.25	0.89	75.0%	1.61	0.12
Marketization of planting	2.26	1.05	13.0%	3.63	1.19	75.0%	3.06	<0.05
Maintain the current state	2.39	0.72	0.0%	3.00	1.51	37.5%	1.52	0.14

Considering social and economic features of Matoushan NNR, this research has designed 5 policy scenarios for knowing the community residents' and managers' response (Table 6). According to sample statistics of responded residents, local residents' choices of different policy scenarios in terms of priority are: (1) engage in tourism industry (4.74); (2) out-migration for work (3.52); (3) immigration (2.74); (4) maintain the current state (2.39); (5) marketization of planting (2.26). According to sample statistics of responded managers, local managers' choices of different policy scenarios in terms of priority are: (1) engage in tourism industry (4.25); (2) immigration (4.00); (3) marketization of planting; (4) maintain the current state; (5) out-migration for work (2.38).

In comparison to immigration policy, local residents are more interested in engaging in tourism industry and out-migration for work, which is related to local residents' attained benefits or effect of the two policies. In Matoushan NNR, out-migration for work is the primary income source for local residents. Though tourism industry in this area is at the primary stage and the residents can only get limited income from it, they believe tourism has a promising prospect.

Furthermore, the statistical analysis indicates that the managers and residents are greatly varying from each other with regard to immigration ($t=2.28$, $p<0.05$), out-migration for work ($t=2.39$, $p<0.05$) and marketization of planting ($t=3.06$, $p<0.05$). On one hand, the managers hope to overcome the contradiction between protection and development in the reserve simply through immigration; on the other hand, they do not want a great deal of young people to work in other places because that will result in a shortage of labor in the county and appearance of a great deal of hollow villages. As with marketization of planting, managers of local forestry bureau and agricultural bureau prefer to develop economic crops and underwood industry so as to increase overall economic income of the county. For the community residents, however, they have little interest in incomes from developing agriculture since per capital cultivated land is small and the common farming way is self-sufficient.

Most community residents and managers are holding an optimistic attitude towards participating in tourism development but local residents are generally unwilling to participate in tourism planning

Table 7: Expectations after the NNR is established

		Residents		Managers		T-Test	
		Count	Percentage	Count	Percentages	t	P
Liberalize limitations	Yes	5	21.7%	4	50.0%	1.53	0.14
	No	18	78.3%	4	50.0%		
Give subsidies	Yes	5	21.7%	3	37.5%	0.86	0.40
	No	18	78.3%	5	62.5%		
Develop tourism	Yes	20	87.0%	7	87.5%	0.38	0.97
	No	3	13.0%	1	12.5%		
Enhance the management	Yes	2	8.7%	3	37.5%	1.96	0.06
	No	21	91.3%	5	62.5%		

The statistical analysis indicates that the expectation of managers is not significantly related to that of community residents after the reserve is established (Table 7); the two parties hold similar attitudes towards liberalization of policies ($t=1.53$, $p=0.14$), giving subsidies ($t=0.86$, $p=0.40$), developing tourism ($t=0.38$, $p=0.97$) and enhancing the management ($t=1.96$, $p=0.06$).

In the survey questionnaire on attitudes towards participating in developing tourism, 6 questions are presented for knowing the residents' and managers' attitudes and behaviors towards tourism development (as shown in table 9). The rating is positive, that is, unwilling is rated as 1 point, quite unwilling as 2 points, common or neutral 3 points, quite willing 4 points and very willing 5 points.

Table 8: Attitudes towards participating in tourism development

Content	Residents			Managers			T-Test	
	Mean	Std. Dev	Approval Rate	Mean	Std. Dev	Approval Rate	t	P
Participate in tourism development	4.22	1.04	82.6%	4.00	1.31	87.5%	0.48	0.64
Run tourist reception projects	4.39	0.84	86.7%	3.38	1.19	50.0%	2.65	<0.05
Participate in tourism planning	2.57	1.24	21.7%	3.63	1.30	62.5%	2.06	<0.05
Participate in environmental protection and resource management	3.35	1.03	30.4%	3.88	1.55	75.0%	1.09	0.28

Hired by a tourism enterprise	3.87	1.10	65.2%	3.63	1.30	62.5%	0.52	0.61
Participate in tourism education and training	3.83	1.15	65.2%	3.88	1.13	62.5%	0.10	0.92

From Table 8, we can see that most of the community residents (82.6%) and managers (87.5%) hold a positive attitude towards engaging in tourism development. Among the community residents, 86.7% of them are willing to run some tourist reception projects and 65.2% are willing to be hired by a scenic area or tourism enterprise but only 21.7% are willing to participate in tourism planning and 30.4% are willing to participate in environmental protection and resource management. Therefore, the residents are greatly driven by economic benefits from tourism development; meanwhile, they have a low degree of perception of the importance of environment and do not realize that environment and resources constitute the foundation and precondition for developing tourism industry. In addition to that, the average point and approval rate of the education and training option are very high, which means the community residents have a strong desire for knowledge and skills.

In terms of running tourism projects ($t=2.65$, $p<0.05$), the managers may hold that the phenomenon of hollow village is severe nowadays and there are not enough labors for running projects. However, the community residents hold that young people of their families will be willing to go back home for work as long as there are good job opportunities and economic benefits. As with participating in tourism planning ($t=2.06$, $p<0.05$), the community residents have a very low degree of recognizing and participating in the planning and are not willing to actively participate in the planning compared with the managers.

CONCLUSION AND ENLIGHTENMENT

Development of a reserve is inseparable from life of local community residents. The managers' and community residents' different perception of goals of NNR management are likely to become the source of conflict between the reserve and community. This paper, through selecting community residents and managers as objects of survey respectively and observing their attitudes towards current living state in the reserve and response to relevant policies and future development of the reserve, has made an analysis of factors that affect the relationship between the reserve and community. On the other hand, response from local residents is established upon interaction between their benefits and goals as well as relevant policies of reserve management, so it can objectively reflect subjective wishes and objective facts and provide reference for future management of the reserve.

As a matter of fact, the inherent contradiction between the reserve and community can only be overcome in a real sense when an effective mechanism for promoting harmonious development of the reserve and community is found. In this way, the reserve management can be integrated with community development policies and sustainable development of the reserve.

Establish a long-term and stable benefit-sharing mechanism for the nature reserve and community residents

While trying to improve economic development level, living conditions and education level of the community, the reserve should minimize negative impact on the community and encourage the community to serve the protection of biodiversity. Only in this way can the harmonious development between the reserve and community be achieved. For the residents in the reserve, therefore, a lack of an effective benefit compensation mechanism after establishment of the reserve is the objective basis for the contradiction and conflict between the reserve and community residents. The reserve can make use of favorable environmental foundation of the experimental area and peripheral zone to develop low-intensity and ecological secondary and tertiary industries so as to achieve industrial diversification and provide local community with subsidies.

Enhance public participation and achieve win-win of protection and development through multiple forms

As a beneficial exploration for nature reserve management model in China, community co-management gives full consideration to benefits of local government and community residents. It has displayed unique advantages. Community co-management can effectively arouse residents' enthusiasm to participate and establish an incentive mechanism that compels different stakeholders to actively participate in co-management so as to enhance self-development capacity of the nature reserve. In addition to that, considering that the residents have a low degree of cognition of community co-management (17.3%), the management department should strengthen the publicity of co-management knowledge so as to enhance residents' consciousness of participating in protection and development of the reserve and enable local community and nature reserve to participate in the whole process of natural resource management, decision-making, implementation and evaluation.

Apply multiple policies to increase job opportunities for local residents

A lack of job opportunities in a nature reserve is likely to result in a great loss of labors in the county. Along with that young labors in the community have out-migrate for work, a great deal of "hollow villages" have been resulted in. Therefore, how to arrange production, life and work of the community residents should be a priority of the reserve. The reserve should get out of the dilemma of passive protection, make its due contributions for local economic construction and community development through establishing an industrial belt, increase job opportunities for local residents and properly coordinate the relationship between the community residents and resource protection.

Implement targeted immigration policies step by step according to the goals of reserve management

On the issue of moving community residents in the nature reserve, the managers hope to overcome the contradiction between protection and development once and for all through immigration. However, results of actual researches indicate that most of the community residents are not willing to leave their hometown. From the perspective of sustainable development of the reserve, it is infeasible to move the residents out of the reserve once

for all. Local government can encourage some residents to develop outside the reserve through making policies and planning; moreover, the government should construct homestays outside the reserve. In this way, economic incomes of local residents can be improved through benefiting from ecological tourism industry and therefore their living conditions will be improved.

Arouse enthusiasm of the residents to participate in construction and management of the reserve and develop eco-tourism

The community residents in the reserve know well local society, culture, environment and resources and such information is very important for constructing and planning the reserve, resource investigations, environmental monitoring and evaluation as well as resource protection and utilization. Moreover, local residents can play a role of saving wages and costs for housing, transportation and construction of other service facilities in the process of constructing and managing the nature reserve and developing eco-tourism. Furthermore, some residents can be changed from relying and utilizing resource to engaging in resource management work so as to relieve pressure from local community on resource protection.

DIRECTIONS FOR FUTURE RESEARCH

In this paper, a preliminary research of harmonious development between eco-tourism development of Matoushan NNR and community benefits is made primarily through empirical research, literature analysis, field investigation, questionnaire survey, conversation with managers, expert interview and other ways. However, future perfection and in-depth researches of many areas are required.

- i. Due to restrictions from time and relevant resources, this research has studied only representative communities while basing on community surveys and interviews. Since Matoushan NNR covers a wide area and communities are varying regarding states of protection and development, the selected survey villages and gathered data are inadequate to present state of the whole reserve. Future researches should enlarge the scope of survey and data collection and apply various methods for sample selection, survey, interview and data processing so as to further specify population characteristics of research objects, make in-depth analyses of the relationship between population characteristics of the residents and their willingness to participate and degrees of participation, study community residents' perception, attitudes and participation behaviors towards tourism in different places of the reserve, identify the law and influencing factors and make the researches feature with a higher degree of universality.
- ii. In this research, the objects of investigation are community residents in the nature reserve and managers and there is a big deviation between effective recovered questionnaires from the community residents and managers. Researches in future should try to make the numbers of samples be close so as to make the analytical procedure be more scientific and the analytical conclusion be more persuasive.
- iii. Through field investigation, department interview and questionnaire survey, the author has made some empirical research of the community residents and managers. However, the eco-tourism development of Matoushan NNR involves many interest-related groups, such as tourists, developers and people who care for the reserve.

Considering that, future researches can make a more in-depth and comprehensive investigation or analysis of more stakeholders so as to identify consensus and disagreement among different interest groups.

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TRIOGRAPHIC ASSESSMENT OF VFR TRAVEL IN CONTEXT OF MALAYSIAN DOMESTIC TRAVELERS

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Abstract

VFR travel is a form of travel that involves visiting family and friends as purpose of visit, or as part of activity. Travelling with the purpose of VFR has been recorded as the main purpose of travel for Malaysian domestic travel market in 2014 where the 46% travelers are travelling for this purpose. However, there is less study in this market especially in context of Malaysian domestic market. Past study has shown that this market seems to be neglected because it did not seem to give a huge impact economically. This market was assumed not utilizing tourism services and not participating in tourism activity. This paper is aim to examine the tripographic of VFR travelers where it assess the trip characteristic of VFR travel in order to have a better understanding of this market in context of domestic travelers. A survey was carried in selected area that packed with domestic travelers. Data obtained used in comparing the trip characteristics among VFR market travelers and non-VFR travelers. This result is useful for marketing strategy and a key planning for tourism destination.

Keyword: Visiting Friends and Relatives, VFR travel, trip characteristics

INTRODUCTION

Tourism industry is one of well-known industry all over the world because it involved many forms of tourism activities ranging from world tour to short trips, from leisure to business purposes. Since the industry has expanded widely around the world, it has become an important industry as it able to generate income and creates job opportunities. By the different types of purpose, the tourists fall under several type of tourism and do differ in their behavior. The different of their behavior will lead to differences in their spending pattern and influence the impact of economy in the area they visited.

Tourist frequently encountered classification by the purpose of visit. The United Nation of World Tourism Organization (2008) proposed the following classification which is personal and business. It is described as Figure 1. Most of the studies today focus on personal which is vacation, leisure and recreation tourist compared to the other form of tourist because this form of tourist are the only type that strictly participate the tourism activities and using the tourism facilities. They were seeing as ones who makethe highest spending on the area that they visited as compared to other segment. So it is crucial to

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know either the other form of tourist such as visiting friends and relatives did make a contribution to the area that they visited.

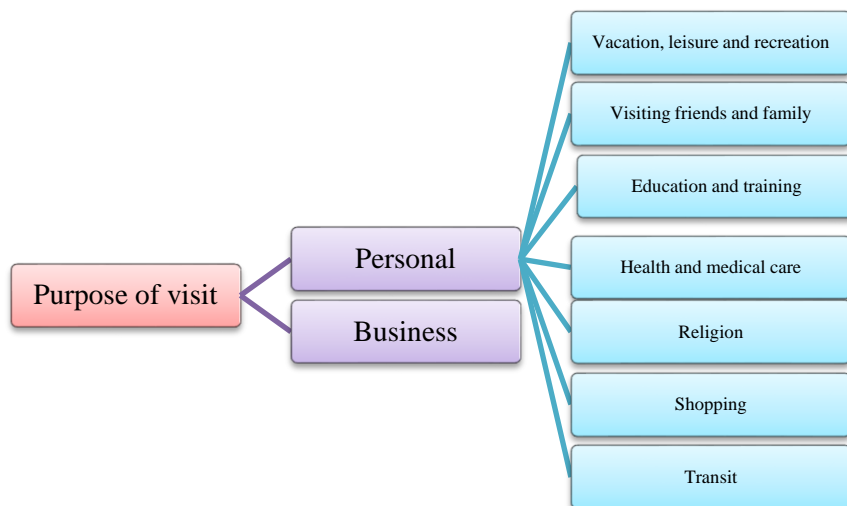


Figure 1: Tourist Classification by the Purpose of Visit

BACKGROUND OF STUDY

Tourism industry in Malaysia is one of main contributor economically. Data shows that 18.8 million of tourist arrival in Malaysia from January to September 2013 and generate RM 46.6 billion (Bernama, 2013). This shows that tourism player keep on improvising their strategies in promoting Malaysia as one of tourist destination. Not only that, they also promoting domestic tourism as well. The rate exchange of Malaysia hotel guest increase 7.8 percent in 2012, which almost 30 million of hotel guest for domestic tourist (Tourism Malaysia, 2013). It can be concluded that domestic tourist also did contributed to the Malaysia economy.

Population growth among the country is one of main reason why this VFR market seems to expand. From census that has been conducted by Department of Statistical Malaysia shows that the growth rate of Malaysian increased 2.0 percent which the total population in Malaysia on 2010 is 28.3 million. It is normal when people start to move from their hometown for different types of purpose such as job's requirement, furthering study or even seeking for new environment. In rural area especially, it is such a trend where the younger generation tend to seek for job opportunities far away from their home. Their friends and relatives left make population. So as the population grows, VFR market grows as well. Almost half of Malaysia domestic traveler categorized as VFR market where their primary purpose is for visiting friends and relatives according to Malaysia department of consensus. Data shows that the highest trips were made during festive seasons and school holidays.

There are many factors that encourage this group visit their family and friends regularly. From holidays and festivals, accessibility, to increase price of accommodation may contribute them to visit and/or stay with their families and friends. However, it is

still lack information regarding on this group of people especially in Malaysia. Research on participation or non-participation behavior offers one means of assessing the latest demand for tourism in which it is essential for tourism policy maker and planner (Wu, Zhang, & Fujiwara, 2011)

This research attempts to analyze the tripographic of VFR travelers in context of Malaysian domestic market segments. As stated by Ramachandran (2006), this type of traveler not only visiting their friends and relatives, but also contributes to the bigger picture of tourism. This research will help tourism player on providing suitable activities and facilities for them by valuable information they provided

VFR TOURISM

Visiting friends and relatives are activity involve visiting friends and family that includes attending wedding, funerals or any family events which include short term caring of sick or old (WTO, 2008). VFR has been recognized as large form of tourism worldwide, and one of the oldest form of travel which was stated by Backer in 2011. She also concluded that VFR travel is a form of travel that involves visiting friends and/or relatives and where friend's or relative's accommodations being used. This is because the travelling to visits friends and family is important socially. The study relates to this type of tourism started in 1990 where Jackson in his article about the international VFR travelers in Australia creating a new wave of VFR market analysis where he stated that this particular market and their contribution has been underestimated. Since then, it is resulting in a succession study stresses on VFR. Jackson stated that VFR market was neglected since those travelers categorized themselves as leisure vacationers therefore leading to overlooked of this travelers in official figures. Since 1990, a content review regarding on VFR market identified that it is only 46 papers that relates specifically on this market (Griffin, 2013).

VFR MARKET MODEL: PURPOSE OF VISIT AND ACCOMMODATION

As explained before, VFR travel is a form of travel that involves the purpose of trip or the type of accommodation involves visiting friends and relatives. For the trip characteristics purpose, it shows that friends and relatives do influence the choice of accommodation of travelers especially for this market. Some reason could be for trip cost saving and hosting. The VFR market can be presented through this model:

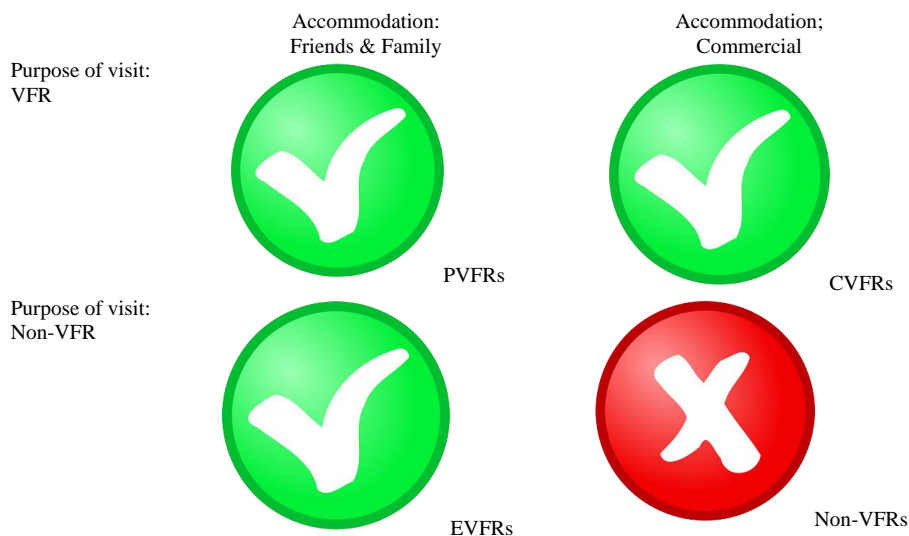


Figure 2: VFR Travel Definitional Model

The model above described that the VFR market fall into three typologies based on the accommodation and the purpose of visit(Backer, 2007). The first one is PVFRs which called the pure VFR where the purpose of visit and the accommodation purely with friends and relatives. Next is CVFRs or commercial VFR where the purpose of visit is visiting friends and relatives but they are having commercial accommodation during the visit. The EVFRs are the group who has other main purpose of visit besides VFR but they staying with them. Jokingly, it has been considered as exploiting their friends and relatives for accommodation used and having other purpose of visit.

RESEARCH GAP

Research from past paper shows that visiting friends and relatives travel was underestimated and ignored (Braunlich & Nadkarni, 1995; Jackson, 2003; Morrison & Leary, n.d., 1993). The awareness about this market was raised after Jackson (1990) in his seminal article about the potential of this market on the tourism industry. Paci (1994) have stated that VFR market was poorly documented which result to neglect of this market. Seaton and Palmer (1997) added the perceptions about this market are which are low economic impacts and cannot be influence by tourism planners and marketing. There are eight reasons why this market was ignored before as stated by Backer (2010);

- i. VFR travel definition difficulties caused by few attempt to define VFR travel.
- ii. Different VFR typologies lead to discrepancy of result based on the tool of measurement and model.
- iii. Difficult segment to measure as they may not only stay with friends and relatives. They also involve hosting activity that lead to additional expenditure for this market from the host.
- iv. This market was having a less attention from DMOs as a part of their target market

- v. VFR traveler does not give a significant impact economically towards the area that they have been visited
- vi. VFR travel has been neglected as a syllabus in a textbook
- vii. As the market tend to be ignored, tourism marketers assumed that this market cannot be influenced
- viii. VFR is a 'poor cousin' of tourism industry as compared to leisure and international tourism industry.

From the reasons above shows that the problems on VFR market segment involve from many party not only from them. Host, DMOs, scholar and etc. should give a proper attention towards this market since some of research proves that this market did give significant impact on the destination specifically and industry generally.

RESEARCH PROBLEMS

Research on tourist characteristics has been conducted by many researchers in many areas. However it still has limited perspectives from the view of specific market segments. Awareness about the potential of this market rose after Jackson (1990) questioned on how this market was underestimated and the contribution of this market. From the view of travelers, they assumed that they are pleasure vacationers which result to small proportion of VFR market data, meaning that the number of VFR market may actually bigger than the number shown. Not only that, tourism players like DMOs assumed that this market not utilizing major tourism services like commercial accommodation and not participating in tourism activity. However, in the case of Malaysia, this type of traveler represents the highest number of total domestic travelers. This was clearly indicated from the view of visiting friends and relatives which their purpose of travel being reported as major motivation domestic pleasure travel in Malaysia according to Statistical Department of Malaysia during 2013. Apart from that, as a country who celebrates many types of holidays and celebrations, this factors influence its citizens to travel more often by many different kind of motives. There is also less number of research on Malaysian VFR market based on typologies proposed by researchers before as many study also trying to develop many models on typologies of VFR market. Study on their trip characteristics will help in determining their tourism participation and expenditure that will explain their contribution on the destination that they has been visited besides to have better understanding on their trip

RESEARCH QUESTION

This research aim is to examine the tripographic factors of VFR travel in the context of Malaysia domestic market travelers, it will address the following question:

- i. How much percentage representing the number of VFR travelers from the total of domestic travelers?
- ii. Does the VFR travelers travels more often as compared to other travelers that has different kind of motives?
- iii. Does the VFR travelers in Malaysia utilizing commercial accommodation?
- iv. How do they spend during their trip to the destination?

RESEARCH AIM AND OBJECTIVES

The aim of this research is to examine the tripographic factors of VFR travel in context of Malaysian domestic market segments. The 'Tripographic' term was introduced by Hu & Morrison (2002) that described as an analysis of trip characteristics which more convenient term to use. The aim will address to the following objectives:

- i. To determine domestic travelers trip characteristics
- ii. To identify the trip characteristics among VFR market segments
- iii. To compare the trip characteristics of VFR market and non-VFR markets

RESEARCH METHODOLOGIES

The data of this research was collected by using survey instrument at the end of school holidays. Quantitative research was used to gather data on domestic Malaysian travelers who just visited Johor and on the journey back to their residential. The purpose of choosing this domestic segment is to get the results that reflect the state of Johor. To make sure only this particular segment will answering this questionnaire, the respondent firstly will be asked either they just began their trip to north or on their way back to their home. The questionnaire paper consists of socio-demographic, trip-characteristics and average daily expenditure of domestic traveler.

This survey was conducted for two days at the rest and service area (RSA) or 'Rehat&Rawat' (R&R) stop point in Projek Lebu Raya Usaha Sama Berhad or PLUS expressway Northbound, located in Pagoh. The R&R is a stop point during long distance journey that have a well maintained facilities and service. It is located in every 8 to 100 km which the purpose is to make the expressway user more comfortable and as a rest area for tired travelers. Some amenities available are air-conditioned food court, Muslim prayer room, toilets, children playground, rest shelters, public phones, and petrol station. With all the good amenities offered and strategically located, this area usually will be packed with travelers especially during festive seasons and long school holidays.

DATA ANALYSIS AND DISCUSSION

Demographic factors

Based on the responses from the survey, a total of 384 respondents were categorized with PVFR, CVFR, EVFR and non-VFR. First section of questionnaire needs them to fill their demographic information. Table 1 show that output analysis of demographic factors of respondents which consist of Malaysian domestic travelers. Each respondent was categorized by the demographic factors with the total number and percentage that represent each category. The highest respondent gender was female's PVFR which represent 75 respondents from the total sample. Most respondents were between the age of 31-40 years old and is a Malay. Apart from that, more than half of respondents were married and hold a degree certification.

Percentage of VFR travelers

	Accommodation: Friends & Family	Accommodation; Commercial
Purpose of visit: VFR	VFR=297 %=77.34%	Non-VFR=87, %=22.66%
Purpose of visit: Non-VFR		

Figure 3: Percentage of Travelers

From the table above, 77.34% of total respondents travel with the purpose of visiting friends and relatives or having visiting friends and relatives as part of their activities. It left the other 87 as non-VFR which is either for business, leisure or other purposes. The result shows that it is true that VFR travelers actually represent bigger number than usually stated. It is because some of VFR traveler does not have visiting friends and relative as the purpose of visit. Some of them are having visiting friends and relatives as part of activity on their trip. Example is EVFR who visit friends and relatives for accommodation purpose and also CVFR who visit friends and relatives as part of activity for their trip with business or leisure purposes. Each VFR market's percentage will be described as below;

	Accommodation: Friends & Family	Accommodation; Commercial
Purpose of visit: VFR	PVFR n=137 n%=35.7	CVFR n=109 n%=28.4
Purpose of visit: Non-VFR	EVFR n=51 n%=13.3	Non-VFR n=87 n%=22.6

Figure 4: Percentage of Travelers by VFR Market Segments

PVFR market was dominating the whole respondents in which represent 35.7 percent of total sample. It is followed by CVFR market and non-VFR market. EVFR market which has not having visiting friends and relatives as purpose is smallest market which only about 13.3 percent of respondent.

Table 1: Demographic Analysis of Travelers by VFR Market segments

DEMOGRAPHIC N=384 N%=100%		VFR TYPOLOGIES							
		PVFR n= 137 n%= 35.7%		CVFR n=109 n%=28.4		EVFR n=51 n%=13.3%		NON-VFR n=87 n%=22.6%	
		%	Count	%	Count	%	Count	%	Count
Gender	Male	45.3%	62	49.5%	54	43.1%	22	55.2%	48
	Female	54.7%	75	50.5%	55	56.9%	29	44.8%	39
Age	<20	10.9%	15	2.8%	3	.0%	0	10.3%	9
	20-30	23.4%	32	22.0%	24	19.6%	10	31.0%	27
	31-40	22.6%	31	21.1%	23	45.1%	23	37.9%	33
	41-50	27.0%	37	40.4%	44	17.6%	9	13.8%	12
	51 and above	16.1%	22	13.8%	15	17.6%	9	6.9%	6
Races	Malay	83.9%	115	71.6%	78	76.5%	39	75.9%	66
	Chinese	13.9%	19	22.9%	25	11.8%	6	20.7%	18
	Indian	2.2%	3	5.5%	6	11.8%	6	3.4%	3
	Others	.0%	0	.0%	0	.0%	0	.0%	0
Marital status	Single	35.0%	48	13.8%	15	5.9%	3	20.7%	18
	Married	56.9%	78	86.2%	94	78.4%	40	79.3%	69
	Divorced Widowed	3.6% 4.4%	5 6	.0% .0%	0 0	7.8% 7.8%	4 4	.0% .0%	0 0
Educational Level	SPM	17.5%	24	19.3%	21	23.5%	12	34.5%	30
	STPM/Diploma/ Etc...	29.9%	41	17.4%	19	7.8%	4	13.8%	12
	Degree	36.5%	50	40.4%	44	51.0%	26	27.6%	24
	Master & Professional	6.6%	9	6.4%	7	5.9%	3	10.3%	9
	Others	9.5%	13	16.5%	18	11.8%	6	13.8%	12

Travel frequencies

	Accommodation: Friends & Family	Accommodation; Commercial
Purpose of visit: VFR	PVFR 4.197	CVFR 4.174
Purpose of visit: Non-VFR	EVFR 3.882	Non-VFR 3.000

Figure 5: Travel Frequencies by VFR Market Segments

The table above shows that the travel frequencies of each market tested. As they were asked on how many times visiting Johor yearly, PVFR has the high numbers of frequency. With the purpose of visiting friends and relatives as the major purpose, it is proving that the social relationship with family or/and friend is important socially as a travel motive (Jensen, n.d.). It is also supported by other VFR market segment which stated higher number of frequencies as compared to non-VFR travelers which stating only 3.000 yearly.

Commercial accommodation

Accommodation:nFriends & Family	Accommodation; Commercial
PVFR n=137 n%=35.7	CVFR n=109 n%=28.4
EVFR n=51 n%=13.3	Non-VFR n=87 n%=22.6

Figure 6: Accommodation Used by VFR Market Segments

Navarro & Turco (1994) explained that one factor that made the VFR market neglected is the perception of this market that they utilizing the commercial accommodation in a very small scale. The above figure shows that more then a quarter of respondents were using commercial accommodation. In fact, their group represents higher number as compared to other travelers with other purpose of trip. It can be concluded that the trend of VFR using friends and family accommodation has been changed slightly since their preference of accommodation turns into using the commercial one. Some of reasons for this changed is the independence of trip planning besides they prefer to stay privately from others.

TRAVELER'S EXPENDITURE

As stated before in reason for the neglect of this market, it was assumed that it does not give a big economic impact on the area that they visited and also was over looked by destination marketing organization as one of potential market. The result was turn surprisingly as table 2 below. Each of respondent stated the average daily spend on each sector based on the activity that they have been participated. Surprisingly, the exploit VFR spent most compared to non-VFR and other VFR market. They are not utilizing commercial accommodation however spend most at shopping and visiting destination attraction. Even though their main purpose is not visiting friends and relatives, they spent large amount of money. Compared to VFR markets, they also spent higher on dining out which mean that even though they stayed with family or friend, they dine out mostly. However, when it comes to accommodation, non-VFR possess the higher spent but does not have great different compare to commercial VFR market.

Table 2: Travelers Expenditure by VFR Market Segments

	EXPENDITURE			
	Typologies			
	PVFR N= 137 N%= 35.7%	CVFR N=109 N%=28.4	EVFR N=51 N%=13.3%	NON-VFR N=87 N%=22.6%
	Mean	Mean	Mean	Mean
Accommodation	0	191	0	201
Dining Out	82	85	119	138
Public Transport	4	23	18	23
Visiting Attraction	72	41	180	178
Entertainment	13	29	25	28
Shopping	202	112	321	163
Groceries	80	25	21	18
Fuel	134	86	124	178
Toll Fees	30	15	30	40
Other	1	0	0	31
TOTAL	618	607	838	807

Preliminary Findings and VFR Definitional Model

Disaggregating the VFR travelers market by the definitional model give a picture of characteristics of each proposed type. Firstly, it support that the number of VFR travelers were actually bigger than it was stated by classifying another type of VFR Traveler which is EVFR. The classification of travelers or tourist by the only purpose of visit will actually disregard one potential VFR market with other purpose of visit such as business and leisure which called EVFR. Apart from that, all VFR travelers seem to travel more compared to non-VFR. PVFR are the most one because it support the statement that is a Malaysian tradition which is '*BalikKampung*' or return to hometown (Unwto, 2013).

Apart from that, by applying another type of CVFR market segment, it is a proof that pattern of VFR trip does not mean by only staying with friend or family only. They would be acting aggressively since they have the independence on planning and moving during their trip. However, results shows that travelers who stayed with family or friends were actually spend more compared to CVFR. In fact, EVFR are the ones who spent more compared to non-VFR. All the results have shown that the assumption of VFR travel area acting passively was untrue since most of the characteristics almost the same with other markets. By disaggregating them, the result much clearer and their characteristics can be determined more easily compared to classifying them as one segment only.

LIMITATION OF RESEARCH

As Malaysia holds many holidays and festive seasons with different kind of races, people tend to move out from their daily routines and travel more with many motives, each holiday and season will reflect different kind of trip characteristics. Each race also has different behavior during their journey.

Apart from this, even though this research population is Malaysian domestics travel market, the result appeared was only reflects on one state only which is in this case

is Johor. Other states that has different infrastructure and amenities besides tourism attraction might giving different characteristics especially on the spending patterns of travelers.

CONCLUSIONS

As VFR market tend to be assumed as passive market before, today's VFR travelers characteristics seems to be contributing to economy and tourism industry. The number of them actually bigger than it was stated since the market was disaggregated by purpose of travel and accommodation used. Also, all the VFR market that was disaggregated also travel frequently compared to non-VFR. This result shows that visiting friends and relatives is one of motive that will make people travel more compare to other motives. Apart from that, the tradition of staying with family or friends during a trip for visiting them seem to be blew since the number of VFR travelers staying at commercial accommodation were quite high. Even they spent less money on accommodation compared to non-VFR market, they did give an impact on commercial accommodation economically. However, VFR markets with the purpose of visiting friends and relatives do spent less as compared to non-VFR, the exploit VFR market spent the most compared to other markets. Not spending on accommodation made them spent more on other activities. It can be concluded that VFR market were actually have a bigger impact not only socially but also in economy and tourism industry.

THE FUTURE RESEARCH OF VFR TRAVEL

In context of Malaysian, there is less number of researches that give a picture of VFR travel. As stated before, this market represents 46 percent of total domestic travelers which is a great figure. A deep research on this potential market should be done to have a better understanding on them. As the trip characteristics can be surface information about this market, some of research can be done as proposed below;

The spending patterns

The expenditure of VFR travelers is complicated since the trip involving three parties which is the travelers, host and tourism operators. The pattern might include travelers spend on tourism operator, travelers spend on host and the host spend on travelers.

VFR travel motive

Even though the motive for travelling is visiting friends and relatives, there are some factors or reasons that made them visit their family or friends. Specifically it questioned why they pay them a visit. Some model or factors can be building to determine the VFR travel motives.

Host involvement

As some of characteristics of VFR traveler already been described, host information and involvement also worth to be interpreted. This is because they are the ones who can influence the travelers directly on their characteristics and behavior during their trip.

Destination marketing towards the VFR travel

The result show that VFR travelers do give an impact towards the economy, some study can be conducted to assess the marketing operation towards this market. The study could be the measurement of the awareness towards this market and also tools used for assessing the VFR travelers. Destination marketing organization and tourism player should have a better understanding on them since their contribution undisputed.

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EVALUATING SIGNIFICANT FACTORS THAT INFLUENCE PUBLIC TRANSPORT USAGE IN KERMAN, IRAN

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Abstract

Although public transport is recommended to develop a sustainable transport system, the percentage of daily trips by public transport in Iran specifically in medium sized cities such as Kerman is very low. Currently, efforts are being made to indicate significant factors that prevent public transport usage in developed countries but few studies have been conducted in developing countries. Only a few studies have considered public transport usage in Iranian megacities and medium sized cities such as Kerman require more attention. Therefore, this study tries to identify effective factors that influence public transport usage in urban areas in developing countries like Iran and in medium sized cities like Kerman. In addition, this study tries to investigate various ways to increase public transport ridership. The people awareness regarding benefits of public transport usage is also tested in this study. This study uses questionnaire and observation to collect data. The descriptive analysis based on the collected data shows that most of the people are aware of public transport benefits. These benefits include environment protection, reduction in parking demand and traffic congestion, lower travel cost (compare with private vehicle), fewer mental stresses, more safety, and being more convenient. Although people are aware of public transport benefits, there are some issues that prevent them to use public transport properly. Insufficient information about public transport schedules, lack of attractive facilities and suitable waiting stations and inadequate reliability are examples of issues that discourage people to use public transport. The results show that some improvements such as providing suitable information about public transport schedules, considering comfortable facilities to increase attractiveness, improving waiting facilities and reliability can encourage people to use public transport.

Keyword: Public transport; Medium sized cities; Developing countries; Suitable and attractive facilities; Public transport benefits; Public awareness

INTRODUCTION

Air pollution is a serious problem in developing and developed countries. Private motorized trips are considerable sources of air pollution. The rate of private motorized trips has been increased in developing countries. The total number of private cars has been increasing significantly between 1990 and 2008 (Ong, H.C. et al., 2012). Decrease private motorized trips and increase public transport usage can reduce air pollution

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(Grange et al., 2014; Rondinelli and Berry, 2000). In addition to the environmental benefits, increase public transport usage has also health benefits since public transport can increase walking and cycling (Grange et al., 2014).

Although using public transport can decrease environmental pollution and road traffic, public transport usage in developing countries is not considerable. For instance, Malaysia has the lowest public transport usage rate in Asia (Ong, H.C. et al., 2012). Furthermore, energy consumption in transportation sector has been increased significantly. Forty years ago, total energy consumption in this sector was between 15% and 20%, but today is around 35% and it is still increasing (Chapman, 2007). Public transport uses less fuel and energy than the private cars (Ong, H.C. et al., 2012). A good public transport system that can encourage people to shift from their own cars to public transport leads to decline private motorized trips, car ownership, energy consumption and traffic density (Wright, 2002).

There are various factors that influence public transport usage. These factors can be broken into socio-demographic factors (Brownson et al., 2000; Pucher and Renne 2003; Shaunna and Konstadinos, 2008; Burbidge et al., 2006; Ewing et al., 2003; Giles Corti and Donovan, 2002a; Pas and Koppelman 1986; and Coogan 2003), quality of service (STIMULUS, 1999; Hensher et al., 2003; Parasuraman et al., 1985; Balcombe et al., 2004; Xiong and Linbo, 2011; ZHOU et al., 2014; Zhang, F. 2011; Xu, G. 2008; and Kumar et al., 2004), reliability (Yatskiv et al., 2012; Balcombe et al., 2004; König, and Axhausen, 2002; Polus, 1978; and Vincent and Hamilton, 2008) and travel information provision (Eveleens M, 2011; Balcombe, et al., 2004; and Stradling, et al., 2001). Table 1 shows summary of factors that influence public transport usage.

There are various studies that show the effects of socio-demographic factors such as gender, age, education level and income on the public transport usage. Brownson et al (2000) found that women are more likely to use public transport more than men. Also women are more likely to walk for transport than men (Pucher and Renne 2003; Shaunna and Konstadinos, 2008). The youth (under age 19) and the elder people (more than 60) are more likely to use public transport (Burbidge et al., 2006; Ewing et al., 2003; and Pucher and Renne 2003) since the youth cannot obtain a driver's license and the elder people may lose their ability to drive with car and they prefer to use public transport (Shaunna and Konstadinos, 2008; Burbidge et al., 2006; Ewing et al 2003; and Pucher and Renne 2003).

Table 1: Summary of significant factors that influence public transport usage

Model	Factors				Method
	1	2	3	4	
Brownson et al., 2000	*				Cross-sectional
Pucher and Renne 2003	*				Questionnaire
Shaunna and Konstadinos, 2008	*				Cross-sectional
Burbidge et al., 2006	*				Questionnaire
Ewing et al., 2003	*				Cross-sectional
Giles Corti and Donovan, 2002a	*				Cross-sectional
Pas and Koppelman 1986	*				Questionnaire
Coogan 2003	*				Cross-sectional

STIMULUS, 1999		*			Correlation method
Hensher et al., 2003		*			Questionnaire
Parasuraman et al., 1985		*			Questionnaire
Xiong and Linbo, 2011		*			Questionnaire
ZHOU et al., 2014		*			Questionnaire
Zhang, F. 2011		*			Questionnaire
Xu, G. 2008		*			Questionnaire
Kumar et al., 2004		*			Questionnaire
Yatskiv et al., 2012			*		Questionnaire
Balcombe et al., 2004	*	*	*	*	Questionnaire, Correlation method
König, and Axhausen, 2002			*		Multilevel method
Polus, 1978			*		Questionnaire, Correlation method
Vincent and Hamilton, 2008			*		Correlation method
Eveleens M, 2011				*	Questionnaire
Stradling, et al., 2001				*	Qualitative method

1. Socio-demographic factors (gender, age, education level and income), 2. Quality of service (the waiting condition, attractiveness, travel time), 3. Reliability, 4. Travel information provision

In Perth, Australia people who have lower income use public transport more than the people with higher income (Giles Corti and Donovan, 2002a). Brownson et al 2001 and Pas and Koppelman, 1986 also found that the people with lower income use private cars less than the people with higher income even when they live in one neighborhood near each other. Educational level is also effective factor for public transport usage. For instance, Burbidge et al., (2006) and Coogan (2003) found that the people with higher educational level use public transport more than the people with lower educational level since educated people are more familiar with the advantages of public transport usage. In addition to the public transport usage educated people also walk more since they use public transport more.

It is needed to regulate the service quality which requested by people to have attractive public transport and encourage people to shift their travel modes to public transport (STIMULUS, 1999). To measure the quality of service, it is important to understand how people evaluate it (Hensher et al., 2003). From the service providers' vision, it is necessary to find the most significant attributes of service quality (Hensher et al., 2003). Some of these attributes such as safety and comfort cannot be measured easily (Parasuraman et al., 1985). Waiting condition is also important in service quality. Travelers prefer waiting for buses or trains in comfortable, clean and safe places while they have protection from bad weather condition (Balcombe et al., 2004, Xiong and Linbo).

Attractive service also can affect public transport usage. The attractiveness has different definitions in various studies. ZHOU et al., (2014) conducted a survey in Tongji Jiading campus in Shanghai to find the attractive factors for public transport usage. The results show that long distance, middle distance, and short distance are effective factors for attractiveness. Based on the findings, travel time is an important factor for people to choose public transport. Customers pay more attention to the attributes of the travel process such as safety and comfort in long distance travel. They also consider travel time, headway, fare and comfort for medium distance travel and travel time, headway,

punctuality and distance to the station for short distance travel (ZHOU et al., 2014; Zhang, F. 2011; Xu, G. 2008; and Kumar et al., 2004).

Another factor that is important for both passenger and public transport operator is public transport reliability (Yatskiv et al., 2012). Reliability is providing a stable service during a period of time so, it depends on travel time reliability, waiting time reliability, arrival time reliability, and punctuality (Polus, 1978). Lack of reliability has effect on users in two ways: a delay when picking up the costumers and a delay when the costumers are on the service (Vincent and Hamilton, 2008). Reliability is one of the important characteristics for passengers in choosing mode of transport. If the public transport system is not reliable, most of the passengers choose private vehicles (Balcombe et al, 2004; König, and Axhausen, 2002).

People who want to use public transport need to have some basic level of information regarding public transport services (Eveleens M, 2011). Travel information provision is very important for public transport passengers and they use this information to plan their daily activities. Reliable and real travel information leads to increase possibility for passengers to reach their destinations on time (Eveleens M, 2011). Therefore, travel information provision can be one of the important factors for attractive public transport. The quality of public transport increases while travel information is sufficient (Eveleens, 2011). There are some studies that show information provision is one of the important factors that can encourage people to shift from private vehicles to public transport (e.g. Balcombe, et al., 2004; and Stradling, et al., 2001).

Although, public transport is one of the important green travel modes, the percentage of daily trips by public transport in Iran specially in medium sized cities such as Kerman is very low. In addition, the rate of vehicle usage in Iran is increasing in recent years (Verdinejad, 2010). There are lots of studies about significant factors that prevent public transport usage in developed countries but there are few studies in this area in developing countries. In some developing countries such as Iran, this issue is serious specially for medium sized cities like Kerman. Therefore, this study tries to identify effective factors that influence public transport usage in urban areas in developing countries like Iran. In addition, this study tries to investigate various ways to encourage public transport ridership. The people awareness regarding benefits of public transport usage is also tested in this study.

MATERIAL AND METHODS

In this survey the data are collected by questionnaire and observation. The target population includes people who are living in Kowsar neighborhood in Kerman (Iran). Kerman is located in the south east of Iran. Its population was 621,374 in 2011 and it is the 12th most populous city in Iran (Atapour and Aftabi, 2002). Figure 1 shows the general view of Kerman city and figure 2 shows general view of Kowsar neighborhood. The central parts of Kerman are historical neighborhoods. Nowadays, people are moving from these parts to the suburban areas such as Kowsar neighborhood since there are lots of barriers for development in historical neighborhoods. These barriers include lack of infrastructures, conservation regulations for historical neighborhoods, lack of facilities and etc. Kowsar is one of the suburban neighborhoods that attract lots of people in Kerman. Therefore, this study focuses on this neighborhood.

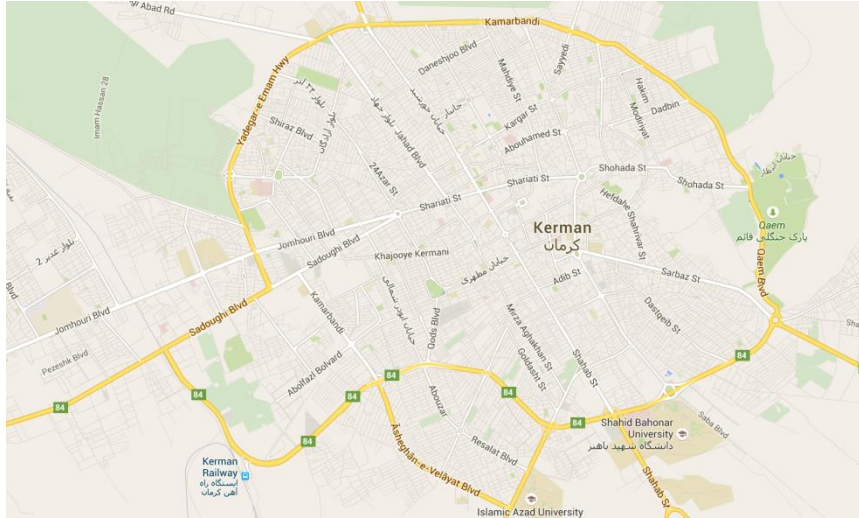


Figure 1: The general view of Kerman city
Source: Google map

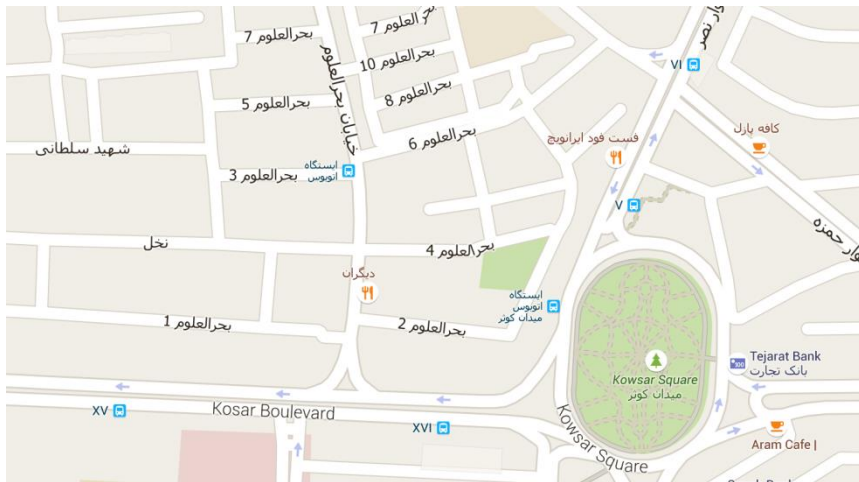


Figure 2: The general view of Kowsar neighborhood in Kerman
Source: Google map

Descriptive data analysis was done by using Statistical Package for Social Studies (SPSS) (Patton, 1990). A survey questionnaire was prepared to record significant factors that influence public transport usage. Also survey questionnaire was adopted with site observation. The standardized questionnaire was used to collect data from a random sample including 100 respondents living in Kowsar neighborhood in Kerman city of Iran. This will be adequate sample size to have 95% confidence level and 10% margin of error base on Kowsar estimated population.

The data collected through survey questionnaires can be divided into four parts. The first part is personal information that includes gender, age, education level, nature of job and income. The second part is about travel characteristics that include vehicle ownership and public transport frequency usage. The third part is about benefits of using public transport and factors that discourage public transport ridership. The last part is related to the accessibility, facilities and service quality. This part includes existing stations in the neighborhood, time to reach the stations, the safety of walking route from home to stations and convenience of the stations.

RESULT

The results show that only 14% of the respondents use public transport regularly. The results also indicate that 64% of the public transport users are female and 36% are male. Most of public transport users have diploma or bachelor degree (56% of female and 40% of male who are using public transport have diploma and the rest have bachelor degree). The results also indicate that 13% of the public transport users use public transport for travelling to work, 39% use it for going shopping, 19% use it to reach educational centers and 29% use it for recreational purposes. Most of people who use public transport for travelling to work are male (90%) while 75% of shopping purpose trips by public transport is related to female public transport riders. In addition, public transport is used by more females for travelling to the educational and recreational centers (67% of travelers are female for both of educational and recreational purposes).

The results show that majority of people are familiar with public transport benefits. Based on the results, 94% of respondents believe that public transport can protect environment more than other motorized modes. They also believe that public transport usage can decrease parking problems and traffic congestions (92% of the respondents). In addition, 85% of respondents think that using public transport is associated with lower costs compare with other motorized mode. Public transport is also effective to reduce stress and increase safety. This is mentioned by more than 60% of respondents.

The results also show that the people do not have serious problem with availability and accessibility of the stations (refer Table 2). Table 2 shows that majority of people are satisfied with the number of stations in the neighborhood. Table 2 also indicates that majority of people do not have safety problem while walking to the stations from home. This table also shows that the walking distance is not a serious issue. However, majority of the respondents are not convenient while they are waiting in the stations.

Table 2: Respondent's satisfaction through availability and accessibility of the stations

Enough stations in the neighborhood	
Yes	81%
No	19%
Walking distance from home to stations	
5 to 10 minutes	22%
11 to 20 minutes	59%
21 to 30 minutes	6%
More than 30 minutes	13%
Safety of walking from home to stations	
Yes	87%
No	13%
Being convenient while waiting in the stations	
Yes	21%
No	79%

Although people are familiar with the benefits of using public transport and they do not have problem with the availability and accessibility of the stations, there are some issues that prevent people to use public transport. Based on the results, 93% of respondents believe that lack of information about public transport and schedules can prevent people to use public transport. They also believe that travel distance and travel time can affect public transport (80% of the respondents). In addition, more than 60% of respondents think that lack of attention to the role of some important factors such as being on time and reliability can reduce public transport usage. Attractiveness, amenities and the station condition are also effective factors for people to choose public transport. Lack of facilities and amenities can reduce public transport usage. This is mentioned by more than 70% of respondents.

DISCUSSION AND CONCLUSION

Although public transport is recommended by various studies to have a sustainable transport system, the results show that only 14% of the respondents use public transport regularly in Kerman (Iran). There are few studies about the significant factors that prevent people to use public transport in developing countries. There are only a few studies about public transport usage in Iranian megacities such as Tehran and medium sized cities such as Kerman have not been investigated. Therefore, this study tries to find effective factors that influence public transport usage in Kerman (Iran).

The results show that socio-demographic factors such as gender can influence public transport usage. Most of public transport users are female and they use public transport for travelling to the shopping, educational and recreational centers. However, public transport is used by more males for working trips. In addition, the people awareness regarding benefits of public transport usage is also tested in this study. The results show that majority of people are familiar with public transport benefits. These benefits include environment protection, reduction in parking demand and traffic congestion, lower travel cost (compare with private vehicle), fewer mental stresses, more safety, and being more convenient. The results also show that the people do not have serious problem with availability and accessibility of the stations. However, majority of the respondents are not convenient while they are waiting in the stations.

Although people are aware of public transport benefits, there are some issues that prevent them to use public transport properly. Insufficient information about public transport schedules, lack of attractive facilities and suitable waiting stations and inadequate reliability are examples of issues that discourage people to use public transport. The results show that some improvements such as providing suitable information about public transport schedules, considering comfortable facilities to increase attractiveness, improving waiting facilities and reliability can encourage people to use public transport. Further studies are needed to find the limitations and solutions for implementing these improvements. In addition, future studies can improve the results by increasing sample size to reach lower margin of error.

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INFLUENCES OF HOUSING SETTINGS AND DESIGNS IN FULFILLING THE MALAY RESIDENTS' SOCIAL CULTURES

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Abstract

This study discusses on the influence of settlement settings and an ideal housing design that can shape a good society and excel in behaviour, the value of life and lifestyle daily. Living environment affects its inhabitants, including the opportunity for the Malay community to practice their norm and values based on Islamic teachings. There are two housing categories in Malaysia, namely as an unplanned settlement (kampongs) and planned settlement (urban housing). Nowadays, majority of the Urban-Malay community are living in modern housing estates in urban areas where the living sphere is different from a traditional settlement such as kampong in rural area. The living environment setting such as the kampongs encourage Malay residents to practice their social cultures. The Malay socio-cultural aspect is established slowly and evolves through time based on values required by religion and inherited from one generation to another. Malays have to comply with all the teachings and practice the values required by Islam. This paper suggests that, to meet such Malay residents' need, a certain physical design attributes from the kampongs should be applied in the modern housing environment at two different levels, called as the micro (house unit) and macro (settlement or neighbourhood) level. Based on the various literature sources, the requirement of optimum living space, the social activities, the family relationship, the neighbourhood concepts and preservation of the privacy element within Malay settlement have been discussed. As a comparison, the existing of linked housing setting has been reviewed in order to compare between the modern and traditional living environments. This paper proposed that the Muslim-Malay resident social cultures are a basis of Malay lifestyle and should be taken into account during the design of a settlement as a whole living environment setting.

Keyword: Housing design and settings, Social-cultures, Linked-house, Kampongs

INTRODUCTION

In the current housing market, there are various types of houses offered for sale by the developer to the buyer. Residential development in Malaysia is operated either by the government through the relevant agencies or private sectors. Housing is a basic necessity for all walks of life. Based on the Preliminary Count Report, Population and Housing Census of Malaysia in 2010 there are 7,380,865 units of 'living quarters'. Living quarters are a place which is structurally separated and independent and is meant for living (Department of Statistics Malaysia, 2010). The term 'separate' means a structure

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surrounded by walls, fences and covered by a roof. While the term 'independent' means any unit has direct access via stairs, roads, and open-space without passing through the other people's territory. Generally, the 'rumah' word in Malay is a reference to any building that is used for shelter and living place (Dewan Bahasa dan Pustaka, 2015). Various policies and strategies were formulated and implemented to help improve the ability of property ownership, especially home ownership among the community. In addition to ensuring basic direction in the planning and development of the housing sector by various stakeholders, a policy, the National Housing Policy (NHP), was introduced. The main objective of the NHP is to provide adequate, comfortable, affordable housing to enhance the quality of life and sustainability (National Housing Policy, 2011).

The question is whether the diversity in the design of housing units offered in the existing market takes into account the needs of Muslim buyers to live in compliance with the teachings and values of Islam in their daily lives? The question is subjective and difficult to measure because there is no specific guideline to build a residential area that complies with the requirements of Muslim life. But Islam outlines some general principles regarding good residential quality like good quality and comfortable home, upholding the good virtue of the local neighbourhood, choosing good neighbours, protecting the environment, maintaining individual privacy, up keeping personal and family safety and protecting individual property. Yusoff et.al. (2004) quoted a 'hadith' narrated by Al-Thabrani in which the Messenger of Allah said:

"There are three achievements of a Muslim in the world, one of which has a spacious and comfortable home".

While another 'hadith' narrated by Ibn Hibban means:

"The Prophet (peace and blessings be upon him) said, meaning: Four things can cause happiness. A pious wife, a spacious house, a good neighbour and a comfortable transport!"

The house is also not limited to the function as a residence that provides spaces to do activities such as eating, sleeping, rest and so on, but also as a place of worship by members. Narrated by al-Bukhary and Muslim, the Prophet said:

"Oh people! Perform your (voluntary) solat (prayers) in your homes because the best solat of a man is the one he performs at home except the obligatory solat."

OBJECTIVES

The purpose of this paper is to discuss the need for a more comprehensive study on the extent of detailed design of the house and its environment that can encourage the Malay community to meet the values of Islam. This study focuses on potential conflicts in modern residential area of linked houses. By comparison, the layout of traditional houses in the village and the environment were also discussed. To what extent the traditional house design and its surrounding setting can meet the aspirations of its inhabitants compared to a more modern housing in the current market? The issues are important to

be discussed because the environment where people live in influences human behaviour. Indirectly, the environments where humans reside affect their character, personalities, and values. This paper suggests that an ideal place to stay should be able to provide an opportunity for residents to meet the values of Islam.

PROBLEM AND ISSUES

A question arises here whether the social problems in the society today is attributed to the failure of the design of living environment? The question is in line with the question why the social problems among the Malay community who are generally Muslims are severe and upsetting while Islam is the religion of the community? What kind of people will be the product of the environment we designed if the theories of environmental determinism on human behaviour really exist? How certain that residential layout influence people to interact?

Anuar, T. et.al. (2011) suggested that the original pattern of housing must be used as a reference to Muslim residential design today. He believes the Western-based interpretation of human habitation is derived from the human-centred paradigm that only feature functional and aesthetic aspects must be disregarded. The housing design became too simple and senseless without soul as a result of neglecting the spiritual elements in the design. Spiritual aspects should dominate the Islamic residential design in a way that;

- a. The house and its immediate environment should be a place to foster the growth of a family, developing a true Muslim personality for oneself, the children and other family members.
- b. The spaces are peaceful to the heart, soul and offer sense of repose
- c. The space that is isolated from the outside world
- d. The spaces to exercise socializing based on the tenets of Islam.
- e. Space to draw closer to God in order to achieve the highest level of faith.
- f. The use of the latest technologies and techniques appropriate to the current situation as long as it can help to achieve the level of comfort, thus improving the relationship with God.

Therefore, in the process of developing a Muslim family, which is true to the context of the Islamic religion, Anuar, T. et.al. (2011) reiterated that a proper housing design that takes into account the principles defined above must be adhered to.

ISLAMIC VALUES IN THE MALAY COMMUNITY

The term 'value' is a presumption that sets a selection pattern of the shapes, tools and goals of the action. The value system in the Malay community, comprises of three dominant aspects of relationships, i.e., between Man and God, Man to Man and Man to the Environment. In other words, it is the guiding principle that shaped human behaviour. Values also influenced the way of thinking, how we behave, human relationships and the implementation of our daily tasks (Abdul Karim, J. and Rezo, K., 2012).

What is meant by 'Islamic values' in the design of a house and its surroundings? Yusoff et.al. (2004) lists several Islamic values found in traditional Malay house design that includes the need to separate between male and female occupants who are non-“*ajnabi*”. In the context of the design of the house, it is understood as an element of privacy. In addition, the concept of privacy in Islam can also be observed in the account

of separating the sleeping areas between boys and girls since the early age of seven years; separating gathering place for male and female guests; evade gazing directly into a house and avoid entering someone's home without permission.

Islam also emphasizes on the concept of neighbourhood as a fundamental aspects of a society. According to the definition of *Fiqh*, neighbours are those who live near a person's house within a span of 40 houses to the left, right, front and the rear. Islam also encourages a person to know a potential neighbour who will live near his home so that it will initiate a sense of togetherness (sense of belonging) and harmony. In the open housing market today is most unlikely that a person is able to choose their neighbours. By comparison, people in the kampongs know more of their neighbours than those who are living in the designated housing areas in the city. The attitude of helping and taking care of one another in a neighbourhood is the virtual attribute of every inhabitant in the kampong. Indirectly, it becomes a form of social surveillance that can provide harmonious relationship between neighbours.

HOUSE, KAMPONG AND THE MALAY SOCIETY

The house is a place of residence or place of human habitation built with pillars, walls and roof. While in terms of functionality, the house has a different function with other buildings such as mosques, sheds and huts. According to Yaakub, I. (1996), there are some similarities in the architectural features of traditional houses in the Malay Archipelago whether in Thailand and Indo-China, namely:

- a. Constructed on pillars and raised floors above the ground
- b. With long articulated roofs, high and sloped and complete with fascia board
- c. Multilevel roofs, glazed
- d. With “*serambi*” or “*selasar*”
- e. Pillars with stones or wooden based
- f. The construction using “*pasak*” (wooden pegs) without using iron nails

However, a house cannot be seen just as a physical entity that serves as a shelter alone. This is because each unit complements each other in an environment that is known as a place to stay. The traditional Malay community inhabits the settlement known as “*kampung*”, kampong or village. Traditionally, the natural environment and the social-cultural aspects of their neighbours influence a settlement. The traditional kampong consists of several traditional houses and is surrounded by a scenic natural environment including forests, rivers, and beaches. According to Mohd Yusof, H. (2011), the ideas and aspirations to build a residential community begins from site selection of a suitable home to live in. Subsequently, the increase in population from time to time, established a range of houses in a group known as the kampong.

The kampong is home to the Malay community and each cluster of houses is usually inhabited by a family (Zul Azri, A.Z. et.al. 2010). The cluster of houses in the kampong exists because the community is concerned with aspects of family relationships. Typically, a parcel of land containing several houses occupied by family members either siblings or relatives. They prefer to stay close to each other to facilitate in getting help or assistance when needed. This phenomenon can be observed through the practice of mutual help among family members and the community.

Indirectly, the kampong is also a 'housing scheme' as seen today. Significant differences between the characteristics of the kampong and the modern housing schemes are that the traditional settlement is not professionally designed, with any development plan or specific guidelines. However, Malay kampong serves as a settlement in the Malay community. To understand the impact of the kampongs on residents, some layout elements or the design settings have to be investigated. The followings are the elements of 'design' for the living environment in the traditional Malay kampongs:

The Concept of the Border

In the kampong, there is no clear physical boundary. Homes often do not have a fence or walls to demarcate their area. The composition of the houses in the kampong is organic and free. Nonetheless, as a centralized settlement pattern, linear and scatter can be observed, these patterns are influenced by natural elements. In addition to that, the spaces that exist between the houses are communal spaces. The space is used collectively with the neighbours for social functions such as feasts and children's play area. Often the natural elements such as fruit trees mark the boundaries of houses in an informal way while the drains and streams are referred to as the border between settlements or kampongs. Collectively, the 'openness' of the settlement pattern is believed to promote the interrelationship between communities of the interwoven neighbourhoods.

The concept of openness or neighbourhood without fences has been introduced in a two-storey linked housing area in Putrajaya. According to the study by Roslan, T. (2011), the application of the concept housing without borders or fences on the linked-houses is believed to promote neighbour relations. The concept, however, needs to be carefully reviewed in the context of its implementation to the current community. Mohamad Tajuddin, M.R. (2009) in an article published by The Star claimed that the concept is not conducive in urban residential areas due to the lifestyle of the urban community is different from that of those in the kampongs. Mohamad Tajuddin further said "*it sounded good on paper: a modern housing estate with no divisive fences, but it does not quite work in the real, Malaysian world.*" Security and privacy issues are some major defects that have been identified.

Housing Settings

Based on the study by Choo (1982), there are two types of housing settings (layouts) in the kampongs of Peninsular Malaysia i.e. the clusters and linear forms. The pattern of clustered kampongs can be found in the area of flatland, estuary and urban areas. The linear patterns are found along the rivers, coastal areas and major road networks. Syed Zainol Abidin, I. and Shazramimin, S. (2011) found that the clustered form of housing settings in the kampong encourages the residents to conduct activities together, increase the level of public surveillance and promote the spirit of togetherness (sense of belonging).

Suitable Distance between Housing

An appropriate distance between each house is required when designing the housing units in a settlement. If the houses are too close to one another, they can compromise the feeling of privacy and caused the feeling of discomfort. Violation of privacy can occur

in respect to view. Islam also prohibits the act of spying or snooping into other people's homes. In a hadith which means:

"Anyone who peeks or looks inside the home of a people without their consent is unlawful for them, then surely for the owner the right for the prier's eyes to be gouged" Source: Translate from e-hadith (2015)

For example the lane behind the house in a linked house type, invites invasion of privacy to homeowners (Mohamad Tajuddin, M.R., 2007). Setbacks in the alley behind a linked house unit must be about 4 to 7 metres from the wall separates the rows behind the houses allowing a certain level of privacy (See Figure 1):

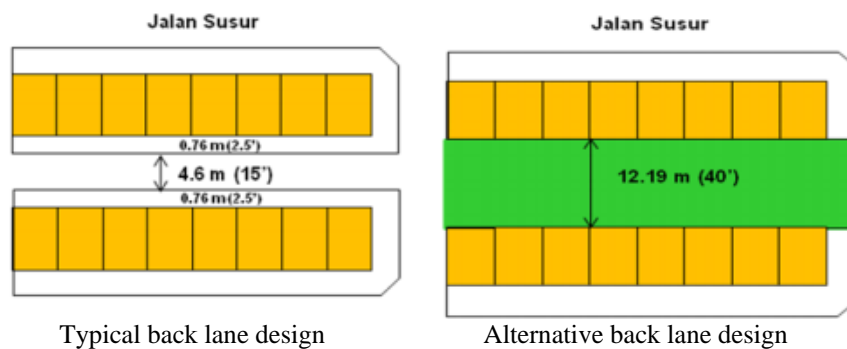


Figure 1: Position housing units that are too close may cause an invasion of privacy to residents (Right). The house window at the back was built in parallel with a row of other houses which may increase uncomfortable feelings among residents. One of the proposed new designs of back lanes (Left).

Source: Original illustration from FDTCP, 2012)

The main function of a back alley is for the purpose of; emergency lane, fire prevention, service routes that include phone lines, sewerage, drainage, garbage collection and sewerage maintenance (FDTCP, 2012). However, it is found that the back lane also contributes to the issue of wastage of land, security problems, low environmental quality and abuse of usage. In the Malay kampong, houses were elevated and built on stilts increasing the higher sense of privacy and the occupants are at a vantage level above ground or the street level, thus avoiding direct visual intrusion by others (See Figure 2):



Figure 2: The illustration shown is the typical traditional Malay houses in kampongs built on stilts

Source: Original illustration by Lat in the Kampung Boy

In addition, the traditional Malay houses are built separately, detached and situated in a suitable distance from each other. But the concept is no longer an option for developers, especially the urban areas. High property values and limited spaces in urban areas tend to cause developers to build high-density residential than detached houses (Refer to Figure 3):

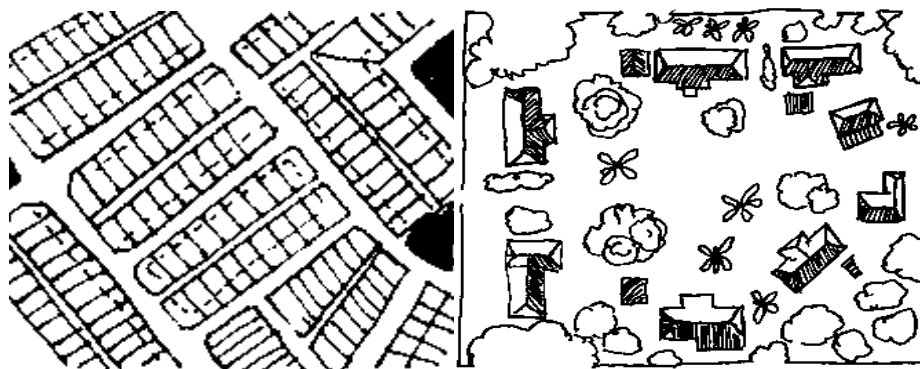


Figure 3: The illustrations show the difference of density and houses arrangement in urban housing and the traditional kampongs. The rigid gridiron typical mass urban housing in Malaysia (left picture) and an organic settlement in rural area (right picture).

Source: Original illustration by author

LINKED HOUSES-A STUDY OF EXISTING ENVIRONMENT SETTINGS

In Malaysia, there are two main types of landed residential (buildings on land) and strata (multi levelled buildings). The type of houses in the landed residential can be classified to be detached houses, semi-detached houses, linked-houses, clustered houses, townhouses and shop houses. While the strata type consists of flats and apartments. This paper only discusses the conflict affected in the linked-house type in meeting the demands and values of Islam of their residents. Linked-house type is one of the most prominent homes in the current real estate market and is known as the home for low and medium income earners. The main feature of the linked houses is the way they are designed in a linear formation sometimes over a gentle hill slope and are in some cases terraced. This housing concept is also known as 'terraced houses' in this country. Because of this arrangement, it is difficult to arrange the house in a variety of layout patterns. Gridiron compositions have always been a top choice of developers in the development of terraced housing in order to save costs. Since the concept of 'terraced houses' was introduced in Malaysia in 1960's to 1970's, various types and variety of home designs were introduced. There are also efforts made to introduce elements of traditional design of residential areas. But Abdul Hadi Harman, S. and Julaihi, W. (2010), found that without understanding the function, ideal, and cultural norms of a design, element is only used to present the surface expression of the building only.

DISCUSSION

This paper proposes to examine the issues concerning the implementation of Islamic values among the Malay community in the residence from two main perspectives, namely at the micro level, i.e. the context of a house of and of macro levels in the context of the environment that surrounds the housing units. At the micro level, the issue of privacy will be focussed. While on a macro level, the neighbourhood concept and social interactions are being focussed.

Separation of Space by Gender (Concept of Privacy)

Modern housing units for example, are not able to expand or contrive according to the needs and desires of the owner. The case is very different from the traditional Malay houses, which are so easily expanded or contrived or even removed in accordance with the interests, and needs of the owners and surrounding community (Nangkula, U. and Kosman, K. 2009). Isolation of beds, gender segregation between '*ajnabi*' and non-'*ajnabi*' are the aspects that are taken into account by the purchaser. Linked-houses on the market usually have more than three rooms to satisfy these needs. One room for the parents and each other rooms for boys and girls. However the rooms are generally too small that the occupants do not feel comfortable using them. Islam prescribes that boys and girls are separated when they reached 10 years of age, so that to avoid problems related to privacy and especially those that may lead to incest. In the past, in the traditional Malay houses, the room is used only by parents, while males will sleep on the '*serambi*' and the females will use either the other available room or a special area within the '*rumah ibu*' bounded by curtains or any kind of fabric separators. In the hadith of Abu Dawud, Prophet Muhammad said:

"Teach your children to pray when they are seven years old, and when they are ten years old, beat them (if they refuse to pray) and part of their bed (boys and girls)." Source: Translate from e-hadith (2015)

The question here is whether the size of the bedrooms built today meets the minimum space requirements of the dwellers? What about those who have large family members - how can they adapt to this kind of home design? The structure of the linked-houses designed lengthwise backwards does not allow the increase in the number of rooms unless; the house is a corner lot. Owners of intermediate houses (in the middle of a row) of the linked-houses will only be able to increase the number of bedrooms at the expense of the setback spaces in front or at the back of the houses prescribed by the guidelines, only if they are given permission to do so. In most circumstances, these permissions are impossible to obtain. With a larger compound, the traditional Malay house features a more dynamic aspect as they are designed in modules. Certain parts of the house can be modified in accordance to the needs of the home owners.

The Neighbourhood Concept in the Malay community

A neighbourly relation is very important in a community, especially for the Malay community. Since time immemorial, the community has been living in groups close to each other and can be seen from the layout of the house in the kampongs. The houses are arranged in groups according to the family unit. Two or more members of the family consisting of siblings or close relatives often occupy one lot. Indirectly, neighbourly relations in the kampong are better than in urban areas because it is established on the basis of family ties. However, Mohd Yusof, H. (2011) found that the family relationship alone is not sufficient to ensure the well-being or rather good neighbourly relations, which often considered as a determinant of the level of well-being of a community. Islam requires its followers to care for the rights of their neighbours and to take care of their neighbours. It is based on Ibn. Umar and Aisha both said, Rasulullah (P.B.U.H) said which mean:

"Always Gabriel counsels upon me about to be kind with neighbours, so that I think he (neighbour) is eligible to inherit my assets" (Hadith of Bukhari and Muslim) Source: Translate from e-hadith (2015)

In another narration, Abu Dhar (R.A) also reported:

"Indeed, my beloved (Prophet Muhammad) has told me, when you cook meat, add more water, then take a look at your neighbours and family members and give a part of it in a good way." (Hadith of Muslim) Source: Translate from e-hadith (2015)

Besides that ALLAH says in Surah An-Nisaa ', verse 39, which says:

"And that you worship Allah and do not associate anything with Him with anything whatsoever, and do good to parents, kinsfolk, orphans, the poor, neighbours who are near or even distant, colleagues, travellers who are

displaced and slaves those whom you possess; verily ALLAH loveth not the arrogant, haughty and proud of himself "

Generally there are three types of neighbours who are distinguished from the rights of a person as a neighbour (Refer to Table 1 below).

Table 1: Summary of Neighbours type from Islamic Perspective

Types of Neighbour	Types of Rights
Muslim neighbour + blood ties	Neighbouring rights, Muslims & relatives
Muslim neighbour + without blood ties	Neighbouring rights and Muslims
Non-Muslim neighbours	Neighbouring rights

Source: Author

According to Muslim (R.A.) narrated from Abdullah bin Amr (R.A.) that Rasulullah (P.B.U.H) said:

"Neighbours are three types: There are among them who has three rights, some have two rights and some have only one right. The neighbour who has three rights is a Muslim neighbour who has a family relationship, which to this neighbour, the right to be neighbours, the right as a fellow Muslims, and the rights of kinship. The neighbour who has two rights is the Muslim neighbours. To this neighbour the rights of a fellow Muslim and the right to be the neighbour. While neighbours who have one right are the neighbour who is a disbeliever who has only the right to be a neighbour" (Hadith of Muslim) Source: Translate from e-hadith (2015)

The question that arises is whether the present design of housing encourages residents to interact with each other and improve neighbourhood relations? An interaction may occur when there is a similarity between the individual and a mutual purpose. Muslim quoted Ali bin Abi Talib (R.A.) means that the Prophet said:

"Choose your neighbours before (building) the house, and (choose) friends before travelling and (provide) the sustenance before death."
 Source: Translate from e-hadith (2015)

Today, home owners do not have the opportunity to choose their neighbours with a home purchase in the open market system. But that is no reason for someone not taking care of the relationship between neighbours and keeps their rights. A more ideal housing layout design is believed to improve the neighbourhood relationship of a community. For example, clustering and ideal housing layout in the kampong encourages residents to interact with each other. Syed Zainol Abidin, I. and Shazramimin, S. (2011), suggest that small changes to the design of existing housing layout and the promotion of cluster houses like those in the 'traditional kampong' will foster social interaction in the neighbourhood.

CONCLUSION

Malay communities are rich with their customs, culture and values guided by the Islamic principle. However, the design of modern housing in urban areas today is often found to ignore the socio-cultural needs of the residents, whether at the micro (a single unit house) and macro (the neighbourhood) level. This paper suggests that the design and concept of housing in this country should be reviewed. In order to promote an ideal living environment for the Malay-Muslim community, lessons can be learned from the traditional settlements such as the Malay kampong. This is because the mass housing concept that is being practiced has been copied out from the experience of Western countries which does not suit the local social-cultural background. A house unit and the whole neighbourhood should be a place where the social development occurs and shape. Children, as for example, are brought up in certain settings where they are influenced by the design and physical housing configuration. They are embedded with good values while growing up and will become part of society in the future. A good living environment can create a good society. This study suggested that the traditional kampongs concept should be explored in detail and used as a basic guide in providing the better residential area. The kampongs sphere should be translated into the new modern housing area that does not only stress on the local cultural identity, but also taking into account the needs and aspirations of the inhabitants of the Malay-Muslim community. This is because, the traditional Malay kampongs that have existed, developed and tested through time has found to be able to build a society that is often described as always taking care of each other, helping each other and interacting in harmony within the living environment. Hence, it is hoped that future national housing design will take into account the social aspects, the formation of individual personality, values and beliefs by providing a more ideal place to live, conducive, high quality and uphold the noble values of Islam.

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**THE IMPACT OF ISKANDAR MALAYSIA DEVELOPMENT ON
URBAN AMENITIES**

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Abstract

For major cities in Malaysia, globalized urban images are enthusiastically pursued by urban policy and explicitly depicted as a blueprint for a civilized city life. These developments have implications to physical and socio-economic developments as well as cultural aspects of cities in Malaysia. This is especially true for Iskandar Malaysia (IM), a new corridor development envisioned to be a “sustainable conurbation of international standing”. The whole initiatives targeted an enormous increase in socio-economic development indicators such as populations (222%), workforce (233%), and per-capita GDP (210%) during a 20-year period of 2005-2025. Since its establishment in 2006, Iskandar Malaysia has witnessed wide spread urban renewal and new urban/suburban projects which resulted in distinct physical and socio-economic changes. One of the challenges to urban consumption is the provision and allocation of amenities to people within the region. A main concern of this paper is to identify the impact of Iskandar Malaysia development on urban amenities distribution. The 2000 and 2010 census data will be explored using GIS to explain the spatial distribution of health, education and safety amenities. This information will be matched with the residential distribution to determine amenities’ location, distribution and accessibility.

Keyword: Gentrification, Iskandar Malaysia, globalization, socioeconomic implication

INTRODUCTION

Since independence Malaysia has built on the initial stock of infrastructure and all categories of infrastructure have since expanded manifold and facilities have also been modernised. The development of infrastructure has required very large investments. The infrastructure sector has received the largest share of public sector development expenditure in every one of the Malaysia Plans. However from the early 1990s because of resource constraints faced by the public sector, among other reasons, the Government has encouraged and facilitated private sector participation in infrastructure development. Three aspects to the Malaysian economy continue to have an important influence on infrastructure development in the country, these being the growth performance of the economy, the physical make-up of the country and the socio-economic disparities between the different parts of the country. These three matters have had to be taken into consideration in the formulation of infrastructure policies and allocation of resources for infrastructure development (Naidu, G. (2008), ‘Infrastructure Development in Malaysia’,

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in Kumar, N. (ed.), *International Infrastructure Development in East Asia – Towards Balanced Regional Development and Integration*, ERIA Research Project Report 2007-2, Chiba: IDE-JETRO, pp.204-227.)

Over the last decade, globalization and economic competitiveness have brought greater pressure on Malaysia particularly in providing high impact infrastructures and facilities to support rapid urbanization and industrialization process. Cities like Kuala Lumpur and Penang have undergone massive physical and social demographic changes similar to other major metropolitan center in Southeast Asian countries (Hogan et al., 2012; Morshidi, 2000; Nasongkhla and Sintusingha, 2012). Iskandar Malaysia launched in 2006 was the second development region to be established after Greater Kuala Lumpur to strengthen the southern region economic condition (Foziah & Adawiyah, 2014). This region was designed to become an international sustainable metropolis. The rapid urban growth in Iskandar Malaysia however bring multiple challenges in managing the region which include providing adequate urban services and amenities, addressing urban poverty, providing infrastructure, establishing efficient governance and revitalizing slum neighborhood (Newton, 2001). The tremendous pressure brought by globalization and urbanization caused urban areas to expand as urban population grew dramatically. The region required a high impact infrastructure and utilities as engine to stimulate the growth and meet the global market. According to Noraniza et al., (2011), development of infrastructure and facilities played a major role in improving the economy and quality of life. It is also argued that a key element in the transition to more urbanised environments is related to the extent to which urban amenities have a role in resident perceptions of quality of quality of urban life (Allen, 2015).

Amenities as claimed by Machado et al., (2013) consist of public and private goods and services that generate positive externalities for the resident and visiting population. While Glaeser et al., (2000) claimed that urban amenities is a driver for urban development and is important in shaping the attractiveness of a place. They also suggested that amenities are influential in determining the location's allocation for others infrastructure and deciding location's destiny. A city as an entertainment machine depends on urban amenities to attract people to choose their place for living and travelling (Clark, 2000). Beside the presence of urban amenities itself, proximity to urban amenities play a major role in generating urbanization and gentrification (Glaeser et al., 2000).

The development of socio-economic infrastructure and amenities indicate the quality of life of the people of a particular area. However according to Parry et al., (2012) urban amenities are not worthwhile until they are adequately provided according to local population size and the extent of area. Partial political practices and imbalanced development policies will result in an unequal and irrational distribution of infrastructure in the region leading to the emergence of urban amenities inequality. Inequalities in accessing urban amenities means inefficiency in the distribution and allocation of facilities between areas or unequally distributed over space due to variegated spatial structure of cities (Aderamo & Aina, 2011; Parry et al., 2012; Stevenson, 2004).

CONCEPT OF URBAN AMENITIES

Generally, half of the world's population now lives in urban area. Urbanization and urban amenities is closely related because urbanization will fuel continued growth and drawn momentum from vast expenditures to meet consumer demand such as urban

infrastructure, amenities and housing (Yusuf, 2009). Urban amenities are specific urban facilities that contribute to residents in carrying out their urban daily life such as access to public transport, schools, grocers and professional services like clinics (Randall, 2009). Aderamo & Aina (2011) defined urban amenities as comprising the goods, infrastructure and services required by urban society to sustain them. There are two type of urban amenities which are public and private amenities. Public amenities are those provided by governments such as parks, public clinics and school, while private amenities may include cafe, restaurants, retail or professional services (Allen, 2015).

The importance of urban amenities contribution to urban growth can be explained in terms of economic sense as well as in the context of quality of life. In terms of economic, it seems that diverse urban amenities can attract more firms and labour. The advantages provide by these amenities will generate concentration of economic and population who prefer to be in close proximity to them (Partridge et al., 2007). Quality of life and provision of urban amenities is also closely related (Chhetri et al., 2011). Accessibility and convenience of urban amenities contribute to urban life experiences (Rappaport, 2008). Access to urban amenities such electricity, sanitation, health care facilities and social amenities play a major role in determining a quality of life (Bhagat, 2011; Yasin et al., 2012). Urban amenities is therefore a crucial factor in shaping urban growth and highly influential in maintaining a socially acceptable quality of life (Glaeser et al., 2000; Parry et al., 2012).

The debate about quality of life was for a long time influenced by three philosophical approaches. The first one is characteristic of a good life influenced by religious or other system. In this context, quality of life depend neither on the subjective experience of people nor on the fulfilment of their wishes but dictated by normative rules. The second approach identified the good life based on the satisfaction of preferences. It is assumed that people select the best of quality of life based on whatever resources they have. Experience of individuals forms the basis for the third approach to quality of life and is most associated with the subjective well-being tradition in the behavioral sciences (Diener & Suh, 1997). This approach is now used as a basis for social indicator and subjective well-being. Social indicator is an approach which involves an evaluation of quality of life by quantitative statistic and is applicable for rural and urban area (Körreveski, 2011). A Malaysia Well-being Index (MWI) developed by the Economic Planning Unit served as the official index investigating the wellbeing of the people in the nation. The MWI was constructed using 14 components with 68 indicators covering the economic and social wellbeing aspects for the period of 2000-2012. The components include income and distribution, transportation, working conditions, health, education, housing, environment, family life, social participation, culture and leisure, as well as public safety. It is a tool used by the government in understanding the changes and improvements in the wellbeing of the people. It also allows the government to evaluate the effectiveness of economic policies. The wellbeing of Malaysians has improved significantly over the last 12 years, according to government data compiled in the first Malaysian Wellbeing Report released yesterday. According to the numbers, the Malaysian Wellbeing Index (MWI) improved by 25.4 points over the period, or an average of 1.9% per year. The index was at 100 points in 2000 and had improved to 133.3 points in 2012.

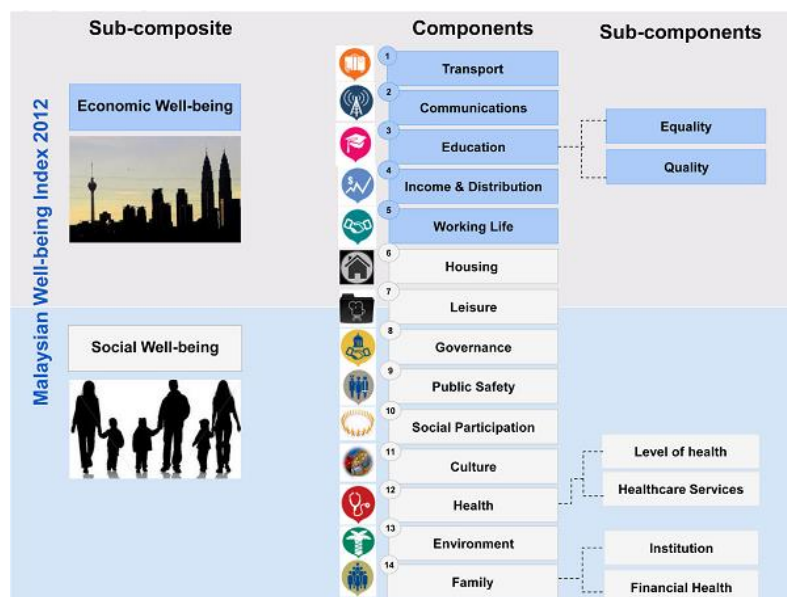


Figure 1: Malaysian Well-being Index 2012

Source: Malaysia Well-Being Report 2013

DEVELOPMENT IN ISKANDAR MALAYSIA

Iskandar Malaysia (IM) launched in 2006 lies at the heart of South East Asian and strategically located at East-West trade routes like Singapore, China and India (Foziah et al., 2006). In terms of regional contexts IM will add competitiveness to the region and will benefit significantly from the air and sea linkages within Asia-Pacific countries. According to Rizzo & Khan, 2013, IM will receive wider impact in relation to the zones of influence of the global cities of Kuala Lumpur and Singapore. The rapid socio-economic development in IM has brought two major transformations (Bunnell, 2002; Sabri, et al., 2012). First, the dramatic increase in urban land prices resulting in clustering of activities in particular areas. Second, the emergence of new socio-economic profile with specific preferences and lifestyle (Embong & Macmillan, 2002). These new socio-economic groups are middle classes that are mostly professionals, managers, and administrators. Since its formation, the region has witnessed rapid development and succeeded in attracting many investors to the region. Iskandar Malaysia is estimated to have 1.35 million people or 43% of Johor's population of 3.17 million by 2025. Some 66% of the population is of working age. As the population of the city grow, the demand for different types of public services and facilities increases (Jahan & Oda, 1994). There are 11 Mukim in Iskandar Malaysia which covers an area of about 2216.3 km². According to Jabatan Perangkaan Malaysia (2013) the current level of basic amenities, distribution and accessibility to public school and health institution in Johor was higher with 70% of population able to access those facilities within 5 kilometers. However, the influx of wealthier residents, and the clustering of business premises in certain area particularly the special economic corridor resulted in certain areas becoming exclusive, at the same

pushing the lower income residents to areas with fewer services, amenities and institutions (Richard, 2014).

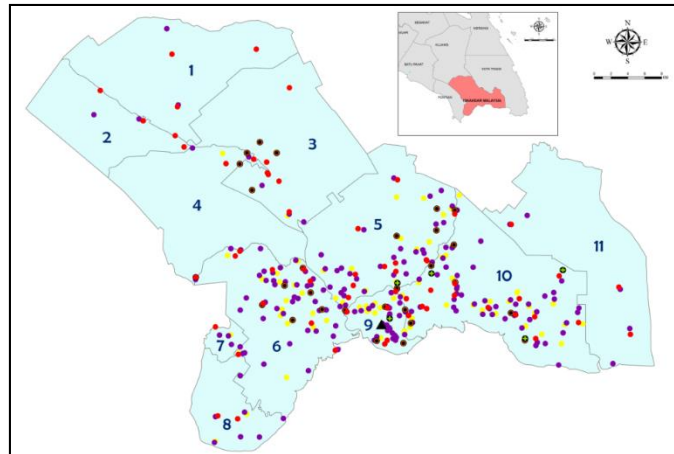


Figure 2: Distribution of health, education and safety facilities in IM

METHODOLOGY

This study focused on spatial pattern and adequacy of education, health and safety amenities distribution at Iskandar Malaysia. The data used for this study were obtained from both primary and secondary sources such as census tract report. The 2010 census data is collected to identify the number of population in each zone to facilitate analysis in the next stage. Data of selected amenities such as number of schools, clinics, hospitals and police station were provided by the Centre of Innovative Planning and Development (CIPD) UTM. The study follows the steps below:

Step 1: Adequacy of Selected Facilities

To determine the adequacy of selected amenities, the number of facilities in each Mukims was calculated in Arcgis and data capacity for each selected amenities was recorded. The capacity of each selected amenities were compared with population in each Mukim to identify areas in Iskandar Malaysia which did not have sufficient facilities.

Step 2: Concentration of Selected Amenities

The concentration of selected urban amenities distribution has been measured by Z-Score variate. Analysis of Z-score variate was used to determine spatial pattern and identify inequality in distribution. This analysis was extensively used in previous research (Aderamo & Aina, 2011; Allen, 2015; Parry et al., 2012). The mean and standard deviation for number of amenities in each mukim was calculate to generate Z-score result and indicate composite indicator. The Z score variate is calculated by the following formula:

$$Z_i = \frac{X_i - \bar{X}}{S_x}$$

$$S_x = \sqrt{\sum_{i=1}^N (X_i - \bar{X})^2 / N}$$

- a) Where Z_i is the Z-score for observation i
- b) X_i is the value of X for the i th observation
- c) \bar{X} is the mean of all the values of X
- d) S_x is the standard deviation of the X values
- e) N is the total number of observations

The study also utilised proximity analysis. Proximity analysis is able to indicate which neighbourhoods are located outside the standard distance. The standard distance to amenities established by the Federal Town and Country Planning Department in the Guidelines to Infrastructures and Public Facilities Planning is divided into 5 levels which are area within 500 meter, 1000 meter, 1500 meter, 2000 meter and 5000 meter. The neighbourhood area located within 500 meter to selected urban amenities is assumed as very accessible.

ISKANDAR MALAYSIA

Nowadays, due to extensive development, a lot of existing natural and agricultural land cover have been converted into anthropogenic land cover. The city-region has also witnessed widespread urban renewal and new urban/suburban projects which resulted in distinct physical and socio-economic changes. Previous land use in Nusajaya for instance, was largely agriculture and green field occupied by villages and fishing communities. Since the implementation of IM in 2006, almost half of land use in Nusajaya can now be categorized as commercial, institutional and public facilities. These include such uses as a private university, hospitals, retail and theme parks. This changes of land use will soon change the image of Nusajaya in term of cultural and ethnic background, personality, attitudes, motivation, income, age, length of stay, lifestyle, social class and socio-economic group (Nasongkhla & Sintusingha, 2012; Suthasupa, 2011)

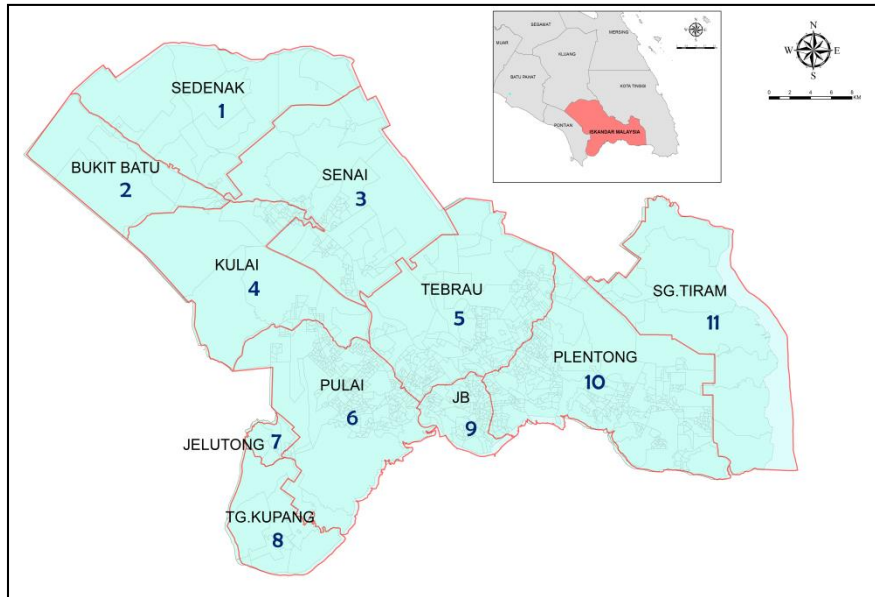


Figure 3: Study Area

RESULT AND DISCUSSION

Distribution of selected urban amenities

Table 5.1 shows the number of population, schools, police station and health amenities in each mukims, within Iskandar Malaysia. It shows that Mukim Plentong has the highest number of facilities with 89 schools, 14 healthcare and 7 police stations. This is followed by Mukim Pulai with 60 schools, 9 healthcare and 7 police stations; Mukim Tebrau (42 schools, 11 healthcare, 5 police stations) and Mukim Bandar Johor Bahru (41 schools, 5 healthcare, 3 police station). The other mukims recorded lesser numbers of amenities for education, health, safety and security.

Table 1: Distribution of Education, Health and Safety Amenities at Iskandar Malaysia

Mukim	Population	Education		Health		Safety and Security		Total
		Primary	Secondary	Clinics	Hospital	Police Station	Community Police Post	
Pulai	360642	42	18	9	0	7	0	76
Plentong	494152	56	33	14	0	6	1	110
Tebrau	316327	29	13	9	2	4	1	58
Bandar Johor Bahru	124096	25	16	4	1	3	0	49
Kulai	93784	5	1	3	0	2	1	12
Sedenak	17212	2	0	4	0	0	0	6
Senai	120312	3	2	6	1	0	3	15
Sungai Tiram	13348	5	0	3	0	0	0	8
Tanjung Kupang	10972	5	2	2	0	0	0	9
Jelutong	14651	4	1	1	0	0	0	6
Bukit Batu	13986	2	0	3	0	0	0	5

Source: 1. Department of Statistic Malaysia, 2. Centre of Planning Development (CIPD UTM)

The provision of education, health and security amenities depend on population size in a particular area. However, educational facilities provided in Mukim Senai are not sufficient to cater for its population which indicate an inequality in distribution when compared to Mukim Bandar Johor Bahru which has almost similiar population range with Mukim Senai. In term of health amenities, the distribution of these amenities in Iskandar Malaysia was adequate and corresponds to population size. There are 4 hospitals within Iskandar Malaysia that have a capacity to accommodate the current population. In terms of safety and security amenities, Mukim Senai, Sedenak, Sg, Tiram, Tanjung Kupang, Jelutong and Bukit Batu do not have a police station although the population in those mukim meet the requirement for the provision of a police station.

Spatial variation of urban amenities distribution

The inequalities and spatial distribution of urban amenities in Iskandar Malaysia was analyse by using Z-score variate. This Z-score variate approach has been used frequently in previous geographic research (Aderamo & Aina, 2011; Parry et al., 2012). Table 5.2 shows the standardized score of spatial pattern of three urban amenities concentration in Iskandar Malaysia which is education, health and safety.

Table 2: Standardized score for urban amenities distribution

Mukim	Education		Health		Safety and Security		Composite
	Primary	Secondary	Clinics	Hospital	Police Station	Community Police Post	
Pulai	-0.4788	-0.02517	-0.89049	-0.6067	1.18535	-0.50269	-1.3185
Plentong	-0.50297	0.27578	-0.85129	-0.6067	0.41995	-0.22826	-1.49349
Tebrau	-0.67001	-0.18242	-0.84989	1.25272	0.47295	-0.0741	-0.05075
Bandar Johor Bahru	0.177	1.38451	-0.80597	1.76319	1.68712	-0.50269	3.70316
Kulai	-0.966	-0.72532	-0.80882	-0.6067	1.38705	0.94308	-0.77671
Sedenak	-0.48083	-0.91555	1.51846	-0.6067	-0.85874	-0.50269	-1.84605
Senai	-1.18494	-0.619	-0.60116	1.83771	-0.85874	2.87819	1.45206
Sungai Tiram	1.51278	-0.91555	1.4297	-0.6067	-0.85874	-0.50269	0.0588
Tanjung Kupang	2.13866	2.33623	0.9365	-0.6067	-0.85874	-0.50269	3.44326
Jelutong	0.72914	0.30206	-0.38767	-0.6067	-0.85874	-0.50269	-1.3246
Bukit Batu	-0.27403	-0.91555	1.31064	-0.6067	-0.85874	-0.50269	-1.84707

Source: Author

Bahru and Jelutong due to the uneven population compare to others mukim. Mukim Johor Bahru has been recognized as city centre for Johor and most of urban amenities have already existed before the implementation of Iskandar Malaysia. Meanwhile, Mukim Senai recorded as less served of education facilities due to its function as industrial area. In term of health facilities, clinics in Iskandar Malaysia were highly concentrated at Mukim Sedenak, Bukit Batu, Tanjung Kupang and Sg.Tiram. Mukim Pulai and Plentong have less concentration of clinics although the numbers of population in both mukim are higher. However, the less provision of clinics in others mukim is not an issue since there are four hospitals has been provided in Mukim Johor Bahru, Tebrau and Senai to meet the requirement of current population for health amenities.

The Malaysia crime index 2013 was higher as much as 74.5% which covered about 111,000 reported cases. Johor Bahru indicates a similar trend where the crime index has increased and ranked as fourth city that has highest crime rates. Despite the state government has provided 16 Community Police Post across Iskandar Malaysia starting from 2010 to prevent crime although crime index does not show any decline (refer figure 4). The higher crime index indicated the level of security and safety still lower. Therefore the distance and location of police station or community police post should be revised to ensure those services are adequate.

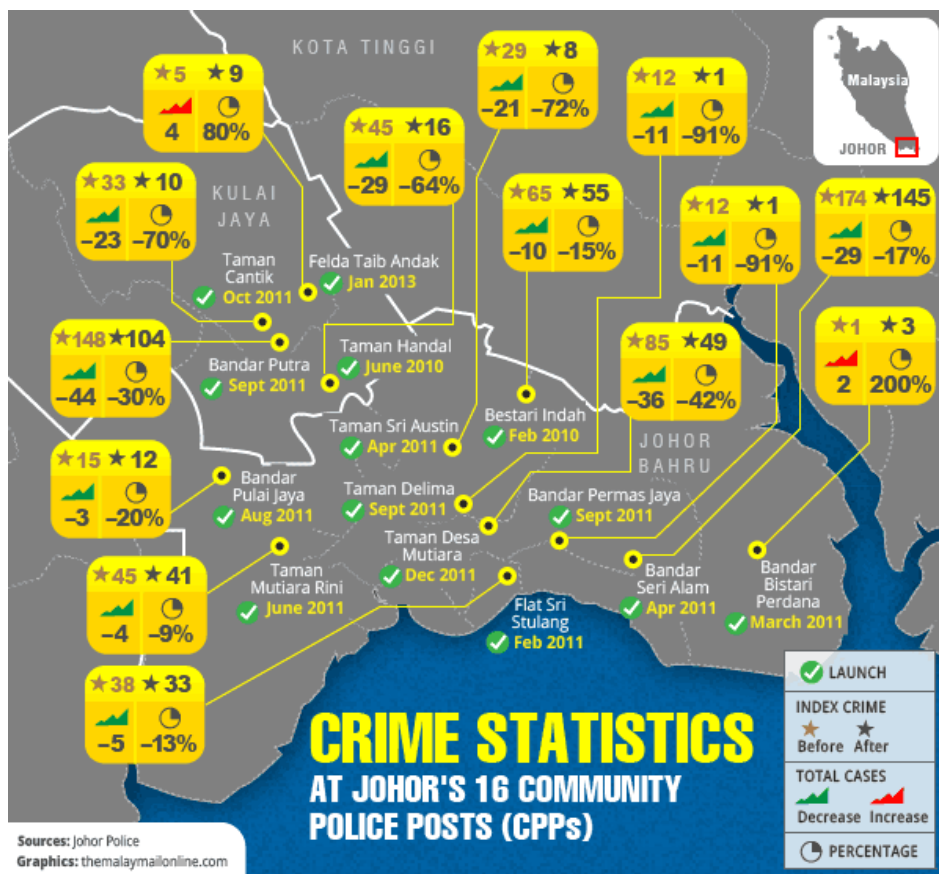


Figure 4: Location of Community Police Post and Population in Iskandar Malaysia

The safety and security amenities pattern in Iskandar Malaysia is much focus to the area with higher population such as Mukim Pulai, Plentong, Johor Bahru, Tebrau and Kulai. The provision of this amenities in others mukim should be considered since there are area which have no police station although the population is higher such in Senai and Sedenak. Based on composite indicator for urban amenities, the provision of social amenities in Iskandar Malaysia is best served in Johor Bahru, Senai, Tanjung Kupang and Sg Tiram, followed by Kulai and Tebrau with mediate level of amenities provision. Meanwhile, Pulai, Plentong, Jelutong, Sedenak and Bukit Batu have the worst level of urban amenities distribution.

Proximity of amenities to neighbourhood in Iskandar Malaysia

The results of proximity analysis show that 96% of residents in Iskandar Malaysia have access to primary schools within 5 kilometres. However, only 17% of the neighbourhood areas meet the planning standard of 500 meters and 28% within 1 kilometre. The distance of more than 1 kilometre will increase the travel distance among residents which at the same time increase the traffic volume.

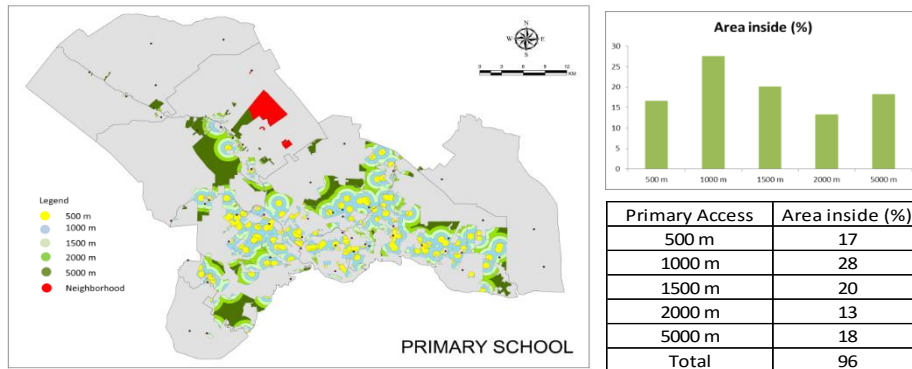


Figure 5: Proximity to Primary School

For secondary schools, 83% of the residents stay within 5 kilometers. The remaining 17% residents located in Mukim Senai and Pulai need to travel more to access the secondary school. The results indicate the potential area especially at Mukim Senai and Pulai to be provided with secondary schools to cater the demand for future. The proximity to health facilities shows 95% of resident in neighbourhood area have access to this amenities within 5 kilometres. However, only 4% have access within 500 meter which indicates that the health amenities are located at non-strategic area.

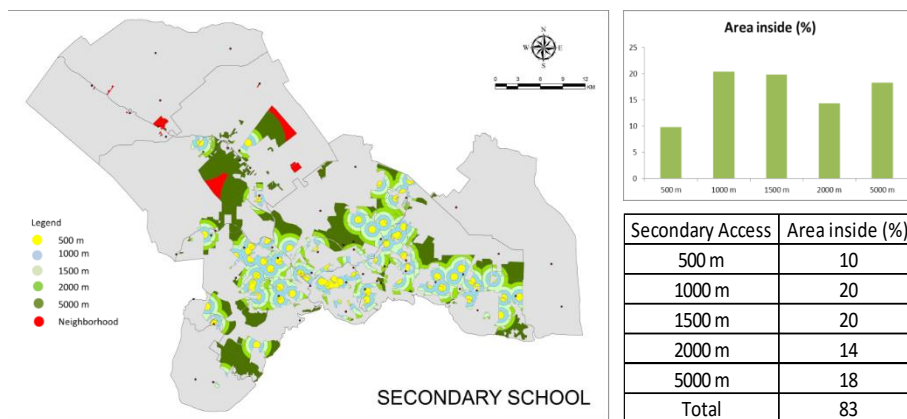


Figure 6: Proximity to Secondary School

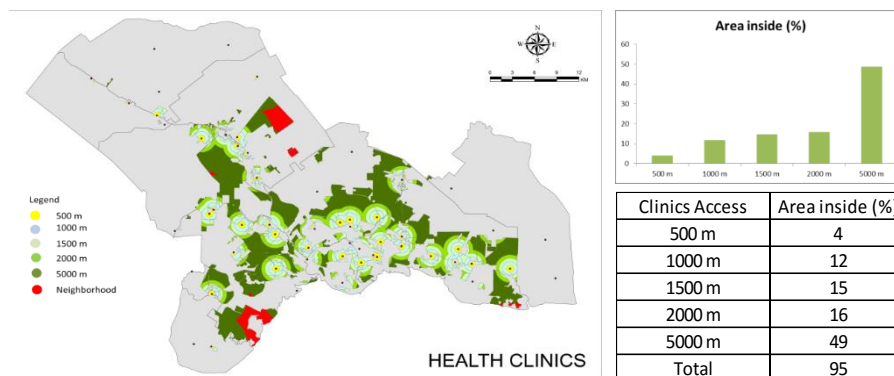


Figure 7: Proximity to Healthcare Amenities

In terms of safety and security, the proximity to police station recorded 80% of residents have access within 5 kilometer. The planning standard for distance to police station is 1 kilometer and only 9% have access within that area. Overall, the proximity to selected urban amenities was higher for current situation. However any areas such as Mukim Johor Bahru, Plentong, Kulai and Tebrau will have to be considered for future population increase.

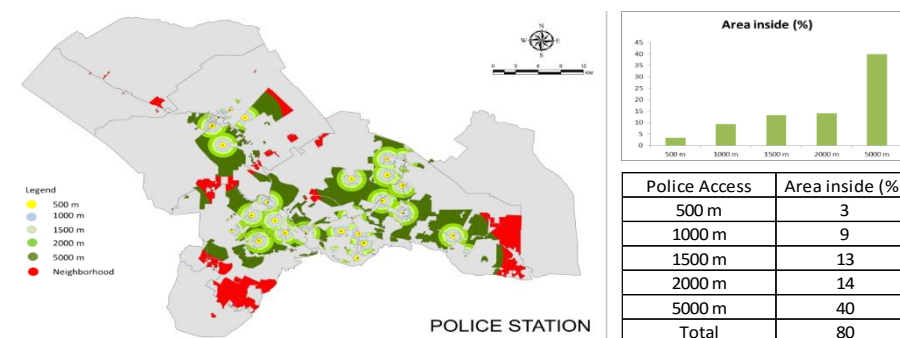


Figure 8: Proximity to Safety and Security Amenities

CONCLUSION

Public facilities such as schools, health centres, police stations are generally not uniformly distributed. This is common in developing countries where apart from uneven population distribution, many other extraneous factors such as political consideration go into locational decisions. However, consideration for the well-being of the people should be a paramount factor in the provision of facilities so that the people will have a sense of belonging and the orientation of the people towards the use of these facilities will also change positively.

ACKNOWLEDGMENTS

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FACTOR ANALYSIS OF MOTORCYCLE CRASHES IN MALAYSIA

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Abstract

This research paper focused on factor analysis of motorcycle crashes in Malaysia. Statistics have shown that Malaysia has the highest road fatality risk (per 100,000 populations) among the ASEAN countries and more than 50% of the road accident fatalities involve motorcyclists. The research literature has shown that key factors that significantly involve in the motorcycles crashes are human factors, road and vehicle conditions and environment factors. The purpose of this research is to analyse the driving attitude, behaviour and habits of Malaysian motorcyclists especially the young students. For this purpose, a research survey (N=210) has been conducted in University Technology Malaysia (UTM) in order to perceive road user perception on key factors that contribute to motorcycle crashes in Malaysia among the young students. The results show that the highest factor that contributes to the motorcycle crashes in Malaysia is the human behavior factor, follow by road and vehicle and lastly the environment factor. Human attitude on the road is the main factor that causes a motorcycle crash. Impatience, careless, selfish and dangerous driving make driver involve an accident. Evidence recommendations are suggested to reduce the number motorcycle crash in Malaysia. Implementation of these recommendations can be helpful to reduce the number of accidents and changing the attitude of young driver.

Keyword: Motorcycle Crashes, Malaysia, Human Factors, Road Factor, Environment Factors, Social Factors, Vehicle Factors

INTRODUCTION

The motorcycle has become popular in certain developing and middle countries and be the most common mode of transportation in Malaysia, Taiwan, Thailand and Vietnam. The relatively low price of motorcycles and their low fuel consumption are among the reasons why motorcycles are so popular in these countries. Due to increasing usage, the number of motorcycle accidents and related fatal injuries in these countries are also increasing. (Nur Sabahiah A.S and Satoshi Fujii, 2011) Accidents happen as a result of the combination of several factors and are often not caused by a single cause. According to the World Health Organization's (WHO's) road traffic injuries defined as "fatal or non-fatal injuries incurred as a result of a road traffic crash" and road traffic crash is defined as "collision or incident that may or may not lead to injury, occur on a public road and involving at least one moving vehicle" (Ghazali Masuri and Khairil Anuar, 2011).

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Road injuries and fatalities are a growing concern in Malaysia, with more than 6000 killed and over 25,000 recorded injuries yearly for the past 5 years. As the total of motorcycle billion kilometres travelled in Malaysia increased from 1999 to 2008, motorcycle fatalities increased as well which indicates that motorcycle casualties are affected by the increase in exposure. Motorization in Asian countries is growing fast and the motorcycle is the dominating transport mode. The number of motorcycles per thousand people averaged over several major Asian cities is approximately 196, which is 7 times the average of the rest of the world.

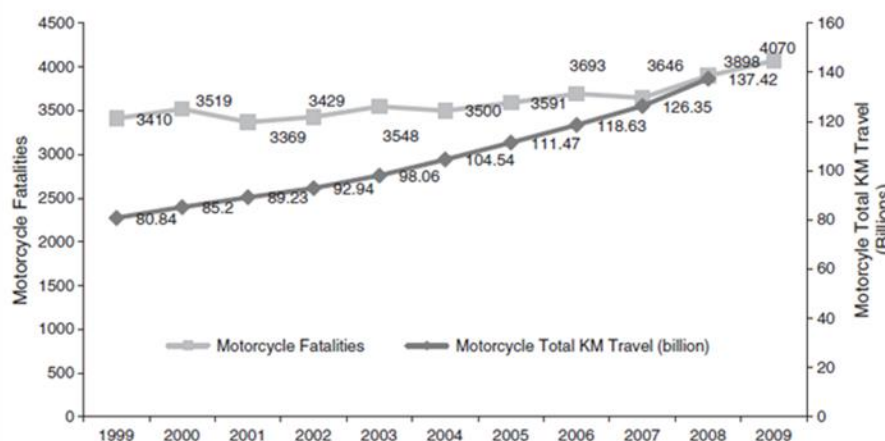


Figure 1: Total motorcycle kilometers travelled and motorcycle fatalities between 1998 and 2008

(Sources: *Motorcycle fatalities in Malaysia*, Muhammad Marizwan Abdul Manan and András Várhelyi, 2012)

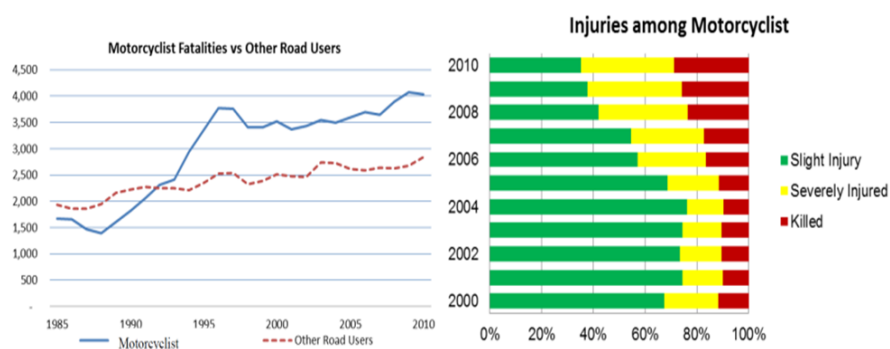


Figure 2: Motorcyclist fatalities vs other road users and injuries among motorcyclist in Malaysia until year 2010

(Sources: *Monash University Accident research Centre*)

In Malaysia, motorcycles offers a cost effective means of travel and represent around 45% registered vehicles and a motorcycle license is available to young adults from

16 year olds and above. In addition, the number of registered motorcycles in Taiwan comprises 50% of the total number of registered vehicles, in Thailand it is 63%, in Cambodia 84%, in Vietnam 95%, in Laos 79% and in Indonesia 73%. Malaysia, with a population of 27.6 million, is not an exception. According to The Road Transport Department of Malaysia, the total number of motorcycles in 2009 was 8,940,230 (47% of all motorised vehicles), which was 5% more than passenger cars. The proportion of the motorcycle population on Malaysian roads varies from state to state. The motorcycle is the major mode of personal transport for the low-income urban community. In general, motorcycles are the major contributor to road fatalities in the country, with no sign of declining in the near future. Moreover, motorcyclists have a higher fatality rate per distance travelled than other vehicles; for example, in 2004, there were 32.2 fatalities per billion kilometres travelled whereas for passenger cars it was 8.39 fatalities per billion. (Muhammad Marizwan Abdul Manan and András Várhelyi, 2012). There are many factors that affect the motorcycle crashes which are human factors, road environment factors, vehicle factors.

According to Monash University Accident Research Centre, 2013, 95% of crash involvement factors are contributed from human factors. Based on the telephone survey of 1922 participants, human factors consist of driver's behaviour and attitudes which do not include helmet wearing, overtaking on the left, riding in the emergency lane, running red lights, riding between moving cars, close behind trucks, speeding behaviours, smoking and use of handphone. In addition, road environment factors contribute 28% as total and vehicle factors are 8%.

LITERATURE REVIEW

HUMAN FACTORS

Based on the above figure, Malaysia is the top ten countries with the highest number of motorcyclers per 1000 population. Motorcycle riders are considered the most crucial component in motorcycle riding. According to Laksanakit C, 2013, over the period of 1996-2006 the numbers of motorcycle fatalities in USA had doubled and the major contribution factors were human errors. Speeding and high alcohol level in blood hit the peak of motorcycle crash causation.

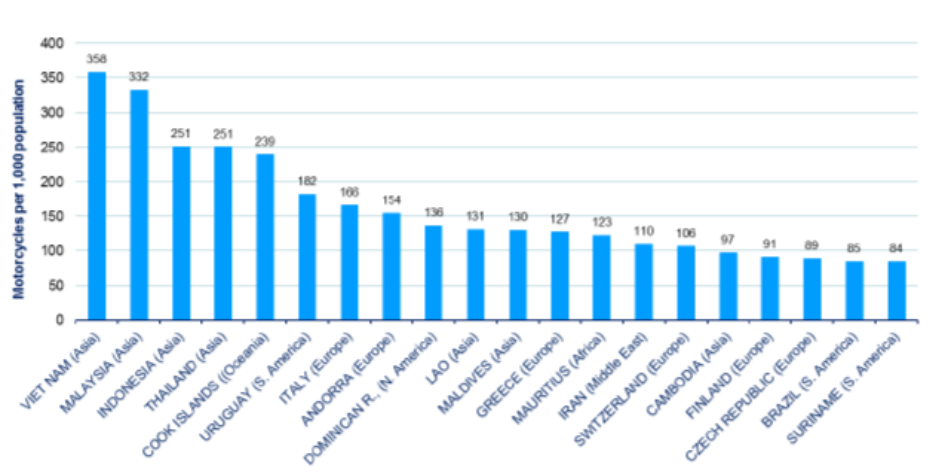


Figure 3: The leading 20 countries with high number of motorcycles per 1000 population

(Sources: Laksanakit, 2013, compiling from WHO 2013 data)

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However, for the motorcycle accident situation in South East Asia, the trend in fatality rate in motorcycle accident in Malaysia has contributed to grow since early 90's. Careless driving was the biggest proportion of driver's faults that affected fatality rate of motorcycle crashes. It was noticeable that a violation to traffic light by motorcycle riders had increased about threefolds. In addition, in Thailand, the key findings was found that young motorcycle riders had poor safe driving behaviour. Their habit of poor driving need to be improved. Besides that, the young motorcyclists in the 18-35 age group tend to violate traffic laws more than other age groups. Moreover, the key risk elements is the inexperience of riders would seem a primary contributing factors to motorcycle crashes. The other human factors found that alcohol was a major cause of motorcycle crashes in Thailand. Most of alcohol effects were evident in the loss of control motorcycle crashes resulting in run off the road or single vehicle crash. (Laksanakit C, 2013).

According to Nur Sabahiah A.S and Satoshi F, 2011, the top cause of motorcycle collision fatalities in Malaysia is head damage resulting from not wearing a helmet. The authors claimed that motorcycle helmets could reduce the risk of head injury up to 72%. In Malaysia, 62.9% of all documented injuries that resulted in death for motorcyclists involved head injuries. As report in the Research Report for National Road Safety Council, in the absence of police, only 55% of motorcyclist wore helmets properly in 1995 and only 41% did so in 1998. Another study reported that 54.4% of motorcyclists wore a helmet properly, 13.6% wore a helmet tied loosely, 8.0% wore an untied helmet and 24.0% did not wear the helmet in rural areas.

The further investigate the casue of motorcycle accidents in Malaysia is the factors that influence the occurrence of speeding behavior must be empahasized. The higher the speeding acceleration, the greater the velocity change while braking, this increased velocity change while braking increases the severity of injuries. Therefore, it has been suggested thet reducing traveling speeds might reduce injury severity during a crash. The suggestion is supported by a study that shows that riding over 60km/h could cause severe injuries to motorcyclists rather than riding at lower speeds (Nur Sabahiah A.S and Satoshi F, 2011).

ROAD / TRAFFIC FACTORS

Malaysia's motorcycle fatalities are not among the worst in the Association of South East Asian Nations, ASEAN. Motorcycles constitute approximately 58% of the vehicles in ASEAN countries, and over the last decade the motorcycle has been the major contributor, with 52%, to road traffic fatalities. From the research, resercher have compare motorcycle fatalities per 10,000-registered motorcycles in each country, Malaysia ranks seventh as per table above. The three highest are Cambodia (75.1), Lao P.D.R (9.6) and Singapore (7.1) in terms of motorcycle fatalities per 10,000 registered motorcycles. However, Malaysia has the highest number of road fatalities per 100,000 population. (Sources: Motorcycle fatalities in Malaysia, Muhammad Marizwan Abdul Manan and András Várhelyi, 2012)

Table 1: Road Traffic Safety Data from ASEAN Countries

No	ASEAN countries	Population (2007)	Registered motorcycle (2007)		Reported fatalities (2007)		Road fatalities per 100,000 population	Motorcycle fatalities per 10,000 registered motorcycles
			Total (million)	(%)	Total	(%)		
1	Brunei	390,056	0.01	4	54	11	13.8	4.9
2	Singapore	4,436,281	0.14	17	214	48	4.8	7.1 (3)
3	Lao P.D.R.	5,859,393	0.51	79	608	80	10.4	9.6 (2)
4	Cambodia	14,443,679	0.13	84	1545	63	10.7	75.1 (1)
5	Malaysia	26,571,879	7.91	47	6282	58	23.6 (1)	4.6
6	Myanmar	48,798,212	0.68	65	1638	10	3.4	2.4
7	Thailand	63,883,662	16.14	63	12,492	70	19.6 (2)	5.4
8	Vietnam	87,375,196	21.78	95	12,800	80	14.6 (3)	4.7
9	Philippines*	87,960,117	2.65	48	1185	37	1.3	1.7
10	Indonesia	231,626,978	46.22	73	16,548	61	7.1	2.2
	Total	571,345,453	96.17	58	53,366	52		

() ranking within category, MC: motorcycle

* Data from 2006.

(Sources: Motorcycle fatalities in Malaysia, Muhammad Marizwan Abdul Manan and András Várhelyi, 2012)

Malaysia's West Coast States have the highest number of motorcycle fatalities and fatality rate per 100,000 populations. The East Coast Region, with a lower motorcycle population and less built-up density, has the highest fatality rate per 10,000 motorcycles. Meanwhile, the Federal Territories, which have the highest population density, record the lowest rate in motorcycle fatality per 10,000 registered motorcycles. Overall, police records show that 61% of these fatalities occur in rural areas while cities record only 8%. Looking deeper into the type of area, motorcycle fatalities are mostly recorded on motorways and primary roads (62%). Apart from this, motorcycles fatalities are also found more in residential areas (20%), as compared to other types of areas shows that the majority of motorcycle fatalities occur on arterial or primary roads. Related to the road

length, the highest fatality rate per 100 km and per 100,000 motorcycles also occurs along primary or arterial roads. Moreover, there are more motorcycle fatalities per 100 km of Malaysian primary roads than on secondary roads, local streets and minor roads combined.

Table 2: Motor Fatality by Road Type in Malaysia in 2009
 Motorcycle fatality by road type in Malaysia in 2009 [1,8,26].

Road hierarchy	Road length		ADT (million)		MC fatalities		MC fatal/ 100 km	MC fatal/ 100,000 MC
	km	%	Veh	MC	N	%		
Expressway	1635	1.3	20.6	*	121	3.0	7.4	*
Primary/arterial	16,939	13.6	12.8	2.6	2021	49.7	11.9	76.7
Secondary/collector	54,681	43.9	6.3	1.6	672	16.5	1.2	42.0
Local street	43,363	34.8	*	*	755	18.6	1.7	*
Minor roads	8038	6.4	*	*	501	12.3	6.2	*
Total	124,656	100	-	-	4070	100	3.3	-

ADT – average daily traffic, Veh – vehicle, MC – motorcycle,

(*) – data is not available.

The traffic count (ADT) covers 70% of each road hierarchy in Malaysia.

(Sources: Motorcycle fatalities in Malaysia, Muhammad Marizwan Abdul Manan and András Várhelyi, 2012)

The great majority of motorcycles fatalities are reported on straight road sections. Fatal accidents involving motorcycles are three times as high on straight road sections compared to the curved sections. Staggered junctions, interchanges and roundabouts have the lowest number of fatalities, recording less than 1.0% fatalities each in 2009.

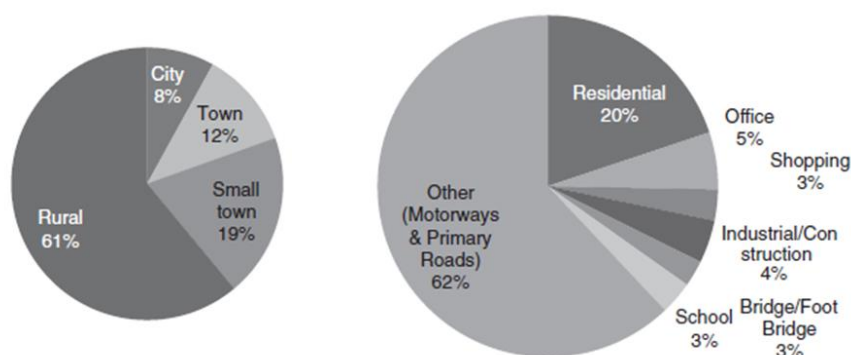


Figure 4: Motorcycle fatality based on area type

(Sources: Motorcycle fatalities in Malaysia, Muhammad Marizwan Abdul Manan and András Várhelyi, 2012)

ENVIRONMENTS FACTORS

One of the factors that contribute to the accident in Malaysia is the environment. Some researcher prefers the term of environment as the weather condition that give effect to the road condition that contribute to the accident. Fine weather does not itself affect driving adversely as the major of the accident occur during this time. The weather also can give the impact regarding to the location of road between urban area and rural area. Rural authority tends to record highest ratio of accident during bad weather. Generally urban area has great traffic densities and a higher level of infrastructure than rural area. Rural area however tend to have less traffic and fewer vehicles on the road. Consequently rural motorists are able to drive at higher speed owing to less traffic and often on poorer roads that were not design for the speed. Rain is the most common weather give affects, accident frequency increase in wet weather condition. The risk of being accident actually can be reduce when the accident occur in rain compare with fine weather, driver may take more care in wet condition by adjusting their speed and driving habits accordingly. However during the rainfall a great number of vehicles involve in minor collisions cause driver not taking into consideration the result of wet road surface. High wind may affect a vehicle's either directly by causing the vehicles to deviate from its course, turn over or indirectly by obstruction dangerous being present in the road such as fallen trees or walls and panelling being blown over (Julia, 1998).

Some researcher prefer the term of environment as the condition of the road. Ministry of Works, Malaysia highlights four approaches in their Road Safety Program in order to improve the road safety, the following engineering approaches have been utilized .Accident preventions, accident reduction, road maintenance and building new roads. In theory, when the users can eliminate or reduce their time or exposure on the road, the possibility of being involved in accidents is reduces. Roads should be built to suit their function and this is the approach used by developed countries such as Denmark and Netherland which seem successful in reducing accidents. In Malaysia, the increase in road accidents is linked to the rapid growth in population, economic, industrialization and motorization industries (Ghazali Masuri and Khairil Anuar, 2011).

Another opinion of researcher, the environment is referring to the location of the road. Research has found the majority of Malaysia motorcycle accident occurs along straight road section and fatal side collision. The present study have shown that road environment influence on the occurrence of traffic conflicts involving motorcycle entering from access point and merging with traffic on primary road in Malaysia (Marizwan Abdul Manan, 2014). Based on the previous research it has shown that there are several factors that contribute to the road accident in Malaysia. The main factors analysis of motorcycles crashes in Malaysia are from human factors, road and traffic factors and also environments factors. In this study reveal the impact of psychological human factors on motorcyclists's speeding anf helmet usage behaviours in Malaysia (Nur Sabahiah A.S and Satoshi F,2011). Motorcyclists still lack of awareness rgarding the important of helmet usage especially in rural area because at rural area still lack of police or authority enforcement. Besides that, the attitute towards speeding behaviour. Motorcyclist usually like to overtaking and over speeding because their assume there are small and ease to move, but the danger movement are cause an road accidents.

In Malaysia, motorcycle lanes have been constructed to segregate motorcyclists from other motor vehicles. This study examined the effects of different types of

motorcycle lanes on motorcyclists' speeding action and their psychological factors. Speeding behavior was chosen due to the increased risk of motorcycle fatality usually associated with speed action (Pang et.al, 1999; Haglund and Aberg, 2000; Lin et.al, 2003). The findings from this study demonstrated that the exclusive motorcycle lane has the highest impact on encouraging the speeding behaviour, followed by the inclusive lane and then the paved shoulder. Another type motorcycle lane that usually constructed in Malaysia is non-exclusive motorcycle lane which built on the left side of the existing road on federal or state roads. Physical barrier or pavement marking formed in order to define the corridor as a set aside for motorcyclists. Nowadays, 11 sites within federal road have been constructed with non-exclusive motorcycle lanes and several more are in construction progress with cost RM36 million. According to A Guide on the Design of Cycle Track (1986), the speed limit that appropriate for both exclusive and inclusive lanes is 60km/h. Meanwhile, paved shoulder is another type of non exclusive motorcycle lane that does not have designated pavement marking and barrier that actually functions as lateral support for the pavement. The use of the paved shoulder by motorcyclists is made mandatory by law and other motorists are prohibited from using the paved shoulder except in an emergency. According to A Guide on Geometric Design of Roads (1986), the width of the paved shoulder is variable (1.5 to 3.0 meters) and it is depending on the standards of the attached roads. motorcycle accidents and related fatal injuries in these countries are also increasing (Nur Sabahiah A.S and Satoshi Fujii, 2011).

In addition, one of the factors that contribute to the road accident is in term of environment. Researchers have difference opinion regarding to the term of environment. First researcher define environment as the weather condition that give effect during the accident occur, for example accident frequency increase in wet weather condition (Julia,1998). Second researcher define environment as condition of the road, roads should be built to suit their function (Marizwan Abdul Manan, 2014). Third researcher define environment as the location of the road. According to the researcher accident usually occur along the straight road and fatal side collision (Ghazali Masuri and Khairil Anuar, 2011).

RESULTS AND DISCUSSION

The data has been analysed for overall three factors which is human behaviour, road vehicles, and environment factors. The factor analysis for below factors is the possibility of UTM students involved in motorcycle accidents has been studies. The scree plot is a graph of the eigenvalues against all the factors. The graph is useful for determining how many factors to retain. The point of interest is where the curve starts to flatten. It can be seen that the curve begins to flatten between factors 3 and 4. Note also that factor eight has an eigenvalue of less than 1, so only two factors have been retained. Based on the table and graph above it has shown two main factors that show the high percentage of variance. One is for over speeding and second is usage of alcohol or drug. These two factors are the main contribution for the accident in Malaysia for human behaviour.

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high percentage of variance. One is for over speeding and second is usage of alcohol or drug. These two factors are the main contribution for the accident in Malaysia for human behaviour. On the road human attitude that likes to drive over speed can cause an accident to other road user. When they drive over speed, sometime they tend to loss control on their vehicles and can hits other road user especially for motorcycle rider. Statistics have shown that there are a high number of percentages of accident in Malaysia is involve motorcycle rider. Second factor that show a high percentage is usage of alcohol or drug. When driver take alcohol or drug they have a tendency to lose control of their self. While driving they also tend to loss control on their vehicles and can hit other road user especially for motorcycle driver.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.213	37.333	37.333	8.213	37.333	37.333	3.933	17.877	17.877
2	2.018	9.171	46.504	2.018	9.171	46.504	3.168	14.399	32.277
3	1.346	6.119	52.622	1.346	6.119	52.622	2.971	13.505	45.782
4	1.218	5.534	58.157	1.218	5.534	58.157	2.723	12.375	58.157
5	.969	4.404	62.560						
6	.860	3.910	66.470						
7	.818	3.719	70.189						
8	.706	3.209	73.397						
9	.618	2.810	76.207						
10	.608	2.765	78.972						
11	.575	2.614	81.586						
12	.563	2.559	84.145						
13	.472	2.144	86.289						
14	.470	2.138	88.427						
15	.436	1.983	90.410						
16	.406	1.846	92.256						
17	.382	1.734	93.990						
18	.314	1.427	95.417						
19	.296	1.347	96.764						
20	.262	1.191	97.955						
21	.255	1.159	99.114						
22	.195	.886	100.000						

Extraction Method: Principal Component Analysis.

CONCLUSION AND RECOMMENDATION

Motorcycles crashes are endless issue. We should take proactive steps to reduce and prevent this scenario because it is better to prevent than cure. Motorcycles crashes could be avoided if all parties regardless of individual, community, Government and Non-Government as well as the united mobilize an effective effort to address the issues of road accidents. A minimum accident rates could raise the prestige and image of Malaysia in

the world stage in order our country is respected, high esteem and labelled as a country that adopts effectively road laws and legislation

The factor analysis shows that human behavior factors likes over speeding, usage of alcohol, less priority on the road for motorcyclist and sudden change of lanes and direction are contributed highest percentages of motorcycle accidents. Therefore, this research is come out with few recommendations in order to reduce the number of motorcycles accidents in Malaysia.

According to human behaviour factor, over speeding is higher percentage of variance with 28.975 %. It is shows human attitudes likes to drive over speed on the road which can cause an accidents. Therefore, Road Transport Department of Malaysia (RTDM) together with Royal Malaysia Police (RMP) especially under Road Traffic Department should co-operate implement an installation speed limit control detector. The detector should be installed inside the automobile in order to control the speed limit. Once they break the speed limit, the detector will send a signal to TDM and RMP for their further actions. The detector shall be registered by follow car chassis number. Hence, summons can be issued to the offender who has driven over speed limit. Second recommendation is Road Transport Department of Malaysia (RTDM) should implement a Continuous Defensive Driving Course and Training to all drivers' license. This is an approach to ensure all drivers are obey with traffic rules as well as encourage them to remain proper driving methods which has been sets by RTDM. As we know, driving course and training only need to be taken once during in the learning process before driving test is taken. Therefore, RTDM should introduce this course at least after ten years the drivers having driving license. The course should have a test whereby, the drivers should pass the test in order to ensure their driving license is valid, otherwise the license will terminated and they should starts from the beginning.

Third, Government Agencies should play a role in enforcement and implementation of Legislation must be more effective. Legislation can be categorized into two major parts, namely the establishment of law and law enforcement. Legislation is a legal basis. Laws established it should have a psychological impact to road users and it should be practical for police to implement. With the law which carries the most daunting road users will afraid to engage in misconduct. Those stubborn road users and threaten to public safety, they can be prevented to do so with the mechanism of prison by law. Effective enforcement can indeed enhance the credibility of laws and may impact on public road safety. Therefore, the Authorities should be equipped with various and good facilities during carry out an enforcement. Hence, penalties must be imposed those anyone who dared to violet the rules of the road. Besides that, improve signage on the road also important in order to reduce number of motorcycle accidents. Every motorist is trying to go somewhere, and many of them are not sure how to go there. Road signage plays important roles because it can give a direction and information to the motorist either their need to turn or not to turn while him or her on riding. In order to reduce road accidents especially for motorist, the respective department need to improve road signage especially in rural highway and suburban area. Many rider at rural area are not aware about the road signage because there assume he or she at their own area or own village. However, at the early stage of application of driving license also are required the driving candidate to attend the theory class and computer test regarding road signage information.

Therefore, by improving road signage along way of the road, it can help riders more alert and aware on road direction and situation.

The authorities must implement the rules of compulsory of using safety jacket for motorist. The safety jacket must be in bright colour or glow in the dark. It is to make others rider or drivers aware about them on the road especially during night time. When the riders wear dark jacket or t-shirt, the possibility people not aware and alert the objects is high. Therefore, using safety jacket when riding can reduce the percentage of rider involve in a major accidents. The others ways to reduce motorcycle accidents in Malaysia is to build a specific lanes for motorcyclist. Motorcycle is a small object on the road especially compare to lorry, bus, or car. Sometime, others driver are not alert about existence of riders on the road. Therefore, build a specific lane of riders or cyclist is a good ways to them to ride because the riders no need to crowded and butted with other vehicles on the same road. Therefore, it can reduce the number of accidents especially during peak hours.

On the other hands, the effective of public transportation can encourage people to use public transportation services. Most of motorcycle riders prefer to use their own motorcycle because it is easy for them to move from one place to another place. When there are a high number of vehicles on the road, the percentage of motorcycle that will involve in accident is high. By make public transportation more effective and efficiency we can attract more motorcycle rider to switch from rider motorcycle to use public transportation hereby we can reduce the number of vehicles on the road and less risk that motorcycle will involve in accident. Besides that, to avoid many license holder in Malaysia; the authorities may be able to increase the age limit to apply the license. Currently in Malaysia, one the requirement if Malaysia citizen want to apply for motorcycle licence is the applicant must be 16 years old. In this age the motorcycle rider is too young, sometimes their action on the road can cause an accident because at this age they are not mature enough. One of the recommendations to reduce the number of accident, Jabatan Pengangkutan Jalan (JPJ) can increase the age limit to apply the motorcycle licence from 16 years old to 18 years old. At age 18, the teenage is more matured; their action on the road can reflect their riding skills, more patient and can tolerance with other. Here we can reduce the percentage the vehicles will involve in accident. Last but not lease, Malaysia government by its agency can make a campaign of safety awareness from time to time to give awareness to Malaysia citizen about the safety on the road. Statistics has shown that the higher factor that contributes to motorcycle accident is because of human behaviour its self on the road. By make the campaign, we can educate and give awareness on how our behaviour can cause an accident and what action can we take to reduce the risk involve in the accident.

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AN OVERVIEW OF CRITICAL SUCCESS FACTORS OF PUBLIC-PRIVATE PARTNERSHIP IN THE DELIVERY OF URBAN INFRASTRUCTURE AND SERVICES

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Abstract

The inability of the public sector to independently meet the increasing demand for infrastructure and services has prompted many governments to adopt Public-private partnership (PPP) as an alternative strategy. In worldwide practices, however, there are mixed results and controversy in the application of PPP model. The Public-private partnership has, for this reason, become an increasingly active research area mainly to establish the Critical Success Factors (CSFs) towards improving the PPP model. This article reviews the current debate on the subject of PPP and compares the findings of different literature regarding the relative importance of CSFs of PPP projects. The authors argue that the CSFs of PPP projects are distinctive to the context of location and time. The article concludes that this subjectivity has implications for the “guaranteed” success of both existing and future PPP projects.

Keyword: Public-Private Partnership, Critical Success Factors, Infrastructure and Services delivery

INTRODUCTION

Rapid urban growth throughout the developing world is seriously outstripping the capacity of most cities to provide adequate infrastructure and services for their citizens. Most urban management agencies in developing countries of the world lack the institutional capacity and financial means to carry out many of the development task assigned to them (Agbola 1998). As observed by the UNCHS (1996), the provision of urban infrastructure is overwhelming as the cities appear to be growing beyond management capacities and available resources.

Having recognized the vital role that infrastructure and services play in the socio-economic development of societies, most governments entrusted their delivery to state-owned enterprises. However, in many places, particularly the developing countries of the world, the results were disappointing because public sector are inefficient (Harris 2003). This inability of the public sector to independently meet the increasing demand for enhanced service delivery (Birner & Wittmer 2006) has prompted many governments to seek for alternatives strategies (Rakić & Rađenović 2011). Subsequently, Public-Private Partnership is adopted (Hammami, Ruhashyankiko, & Yehoue, 2006; Abdel Aziz 2007)

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to help governments cope with the growing demand for public infrastructure and services (Alhomadi 2012).

Over the last three decades, Public–Private Partnership (PPP) has become fashionable (Klijn & Teisman 2003) around the world due to their benefits in delivering public infrastructure projects. However, in worldwide practices, the experience with PPP has not been totally effective (Batley 1996; Hodge & Greve 2007b; Jooste & Scott 2011; Loxley 2013). On one hand, the partnership has been used to deliver a significant number of projects. On the contrary, many partnerships encountered problems and suffered disastrous consequences (Cheung 2009; Alhomadi 2012). Consequently, some PPP projects were either abandoned by the sponsors or bailed by the host governments (Zhang & Chen 2013). The mixed results and the substantial interest over PPPs, therefore, call for an investigation into the explanatory factors for the success and failure of PPP projects towards the improvement of the model.

This article aims to present an overview of the Critical Success Factors for Public-Private Partnership projects. The article discusses the concept, benefits, critical success factors and application of PPP in infrastructure and services delivery through an extensive review of the literature. The article argues that the level of importance of CSFs for PPP projects is idiosyncratic to the dynamics of “location” and “time.” The article concludes by highlighting the implications of this subjectivity to the “guaranteed” success of both existing and future PPP projects.

METHODS

Although the subject of PPP has received wide academic discourse (Van Huijstee et al. 2007), the literature remains largely fragmented (Kivleniece & Quelin 2012). Also, many researchers presented a narrow review of PPP. They include Pantouvakis & Vadoros (2006) in construction, Amobi (2013) in infrastructure development and Roehrich et al. (2014) in the health sector. In contrast, the paper provides a broader range of theoretical backgrounds covering a wide spectrum of PPP application.

This article extensively reviewed the normative literature to provide a comprehensive understanding of Public-private partnership in infrastructure and service provision. The paper consolidates the current debate on the meaning, benefits, application and critical success factors of PPP. Having identified their importance within the framework of PPP research, the article focused on Critical Success Factors of PPP projects. The findings of other researchers regarding the relative importance of critical success factors for PPP projects were compared and contrasted. The article then distilled different viewpoints concerning the relative importance of CSFs, and implications for the success of PPP projects are highlighted (Figure 1).

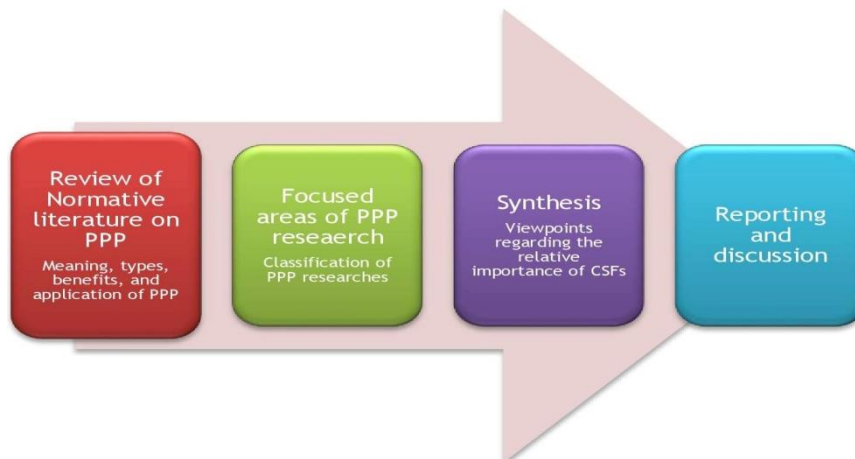


Figure 1: Literature Review Process

THE CONCEPT OF PPP

Since its conception, about three decades ago, the concept of PPP has been strongly contested (Bovaird 2004). Indeed, the overwhelming number and types of PPP makes a single definition difficult (Idris, Kura, & Bashir, 2013; Thomson, Goodwin, & Yescombe 2005). Different scholars, governments, and international organizations have described PPP in diverse perspectives. By seeking to introduce a market mechanism into government business, PPP is described as a derivative of the privatization movement (Savas 2000; Bovaird 2004). As observed by Abdul-Aziz & Kassim (2011), any attempt to shift government role to a private enterprise is tantamount to privatization.

On the contrary, Jamali (2004) and Lovells Lee and Lee (2009) see PPP as entirely different concept from outright privatization. As argued by Jamali (2004), PPP goes beyond privatization of public services but implies a sort of collaboration between two or more partners to pursue common goals. She argued that such collaboration must involve the joint definition of objectives and clear assignment of responsibilities in pursuit of common goals. The collaborating actors mutually agree to share risks, costs and benefits in the development of products or services (Hammami et al. 2006; Kee & Forrer 2008). In that regard, HM Treasury (1999) describes PPP as a long-term cooperation between public and private sectors for mutual benefits. The Ministry of Municipal Affairs British Columbia also defines PPP in line with its UK counterpart as “arrangements between government and private sector entities for the purpose of providing public infrastructure, community facilities, and related services. Such arrangement involves sharing of investment, risks, responsibilities and reward between the partners” (P.5: 1999). As submitted by Van Ham & Koppenjan (2010) PPP involves cooperation between public and private actors in which they jointly develop products and services and share risks, costs, and resources.

Others see PPP as a means of project financing that allows the public sector to reduce its financial constraints by utilizing private sector resources in service provision. As pointed out by Alinaitwe & Ayesiga (2013), many governments see PPP as a means of launching investment programs that would otherwise not be possible within the

available public-sector budget. PPP was predominantly viewed as a means of removing infrastructure costs from the public balance sheet and avoid the constraints of public-sector borrowing limits (Li et al. 2005). However, the WorldBank (2009) had a contrary view and argued that PPPs should not be merely a means of leveraging private sector resources but as a tool for reforming procurement and public service delivery.

Despite several definitions and perspectives of PPP, the critical elements, that characterized a PPP, as identified by Kwak et al. (2009) are four. First, it involves cooperation (Klijn & Teisman 2003) between 2 or more partners. According to European Commission (2003), Public-Private Partnership is an agreement between two parties to work together towards a common goal. Although, the partnership is usually between the public and private sectors, the relationship may, however, involve a consortium of third party interests. The third party interest may include lenders, equity investors, and other interests or non-profit groups (Kwak et al. 2009; UN-HABITAT 2011). Second, the partners work cooperatively towards achieving mutual objectives and benefits. In this regards, Jamali (2004) argued that a relationship can be qualified as a partnership if it involves the joint definition of goals and clear assignment of responsibilities in pursuit of common objectives. Third, it is about the introduction of market mechanisms to achieve efficiency in service provision (Grimsey & Lewis 2004; Babatunde et al. 2012). As explained by Kee & Forrer (2008), PPP involves the introduction of the managerial skills, entrepreneurship, and expertise of the private sector towards increasing the efficiency of the public sector. The adoption of Private Finance Initiative (PFI) in the UK aims to introduce market discipline into the provision of public services (Hammami et al. 2006; Wall & Connolly 2009). Fourth, it involves sharing of risk between partners (Grimsey Darrin and Lewis Mervyn K. 2004; Idris et al. 2013). As submitted by Alinaitwe & Ayesiga (2013), PPPs are risk-sharing investments in the provision of infrastructure and services. The amount of risk transfer differentiates a public-private partnership from traditional procurement. Many relationships may not be considered as partnerships, even where a private company is involved, provided there is no substantial risk transfer.

The underlying logic of establishing a partnership is that both the public and the private sector have unique characteristics that provide them with advantages in particular aspects of service delivery. The principal arguments in favor of public-private partnerships are two. One, it allows for the utilization of private sector resources, expertise, and skills (Ong 2003) to achieve “value for money” (Armitage & Susilawati 2004). The value for money usually translates to improved quality of service, higher efficiency, and lower costs. Secondly, a partnership is a form of cutting cost strategy that allows the government to reduce the overall cost of social transfers. PPP, therefore, serves as a means to preserve scarce capital resources for other purposes (Muhammed 2008).

The essential feature of PPP is that the client (the public sector) usually define the services needed. The private investor then undertakes to design, build, and finance the operation before handing over at the end of the concession period (Kwak et al. 2009). However, in reality, specific project objectives and requirements determine the structuring of partnership arrangements. Therefore, many types of partnerships models are in use today in the pursuit of different project objectives. The types differ depending on the circumstances and dimensions of the business arrangement and the extent of the responsibilities of partners (Mcquaid 2009). Kwak et al. (2009) described different partnership options along a continuum in line with the extent of responsibilities given to

each partner in a PPP arrangement (Fig. 2). At one end, is the public provision where the public sector is fully responsible for all aspects of service provision. While, at the other extreme, is the private provision, where the private sector assumes all those responsibilities. Examples of PPP arrangement include Build-Own-Operate (BOO) and Build-Operate-Transfer (BOT), Design-Build-Operate models. The degree of private sector involvement increases along the continuum; and vice-versa.

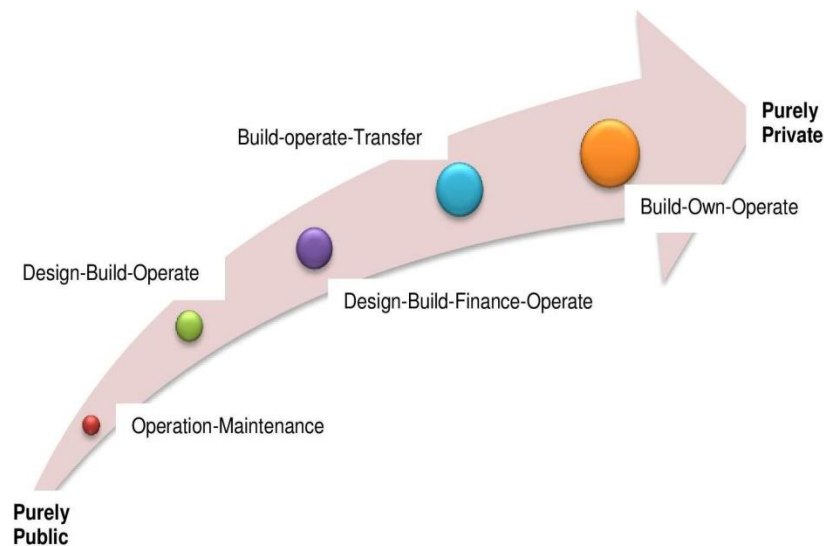


Figure 2: Models of Public-Private Partnership

Classification of PPP Research

The worldwide interest in PPP and the problems encountered in several countries has called for a better understanding of PPP. Many studies, to answer this call, have investigated five main aspects of PPP as follows:

- The roles and responsibilities of government in PPP (Kumaraswamy & Zhang 2001; Koch & Buser 2006; Abdel Aziz 2007)
- The concession selection (Zhang 2004; Zhang & Kumaraswamy 2001)
- Risks in PPP (Thomas et al. 2003; Bing et al. 2005; Nisar 2007)
- PPP finance (Levy 1996; Zhang 2005)
- Critical success factors for PPP (Qiao et al. 2001; Jefferies et al. 2002; Li et al. 2005; Hardcastle et al. 2005; Jamali 2004b; Wang et al. 2007; Babatunde et al. 2012; Hwang et al. 2013; Ismail 2013)

The conceptual framework (Fig 3) for the classification of PPP research highlights the significance of the Critical Success Factors (CSFs) towards improving PPP for effective service delivery.

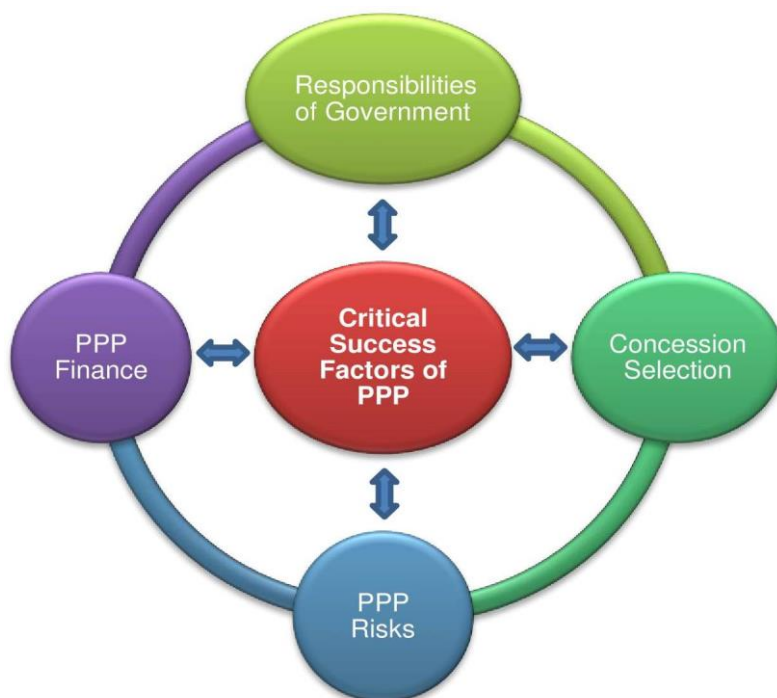


Figure 2: Models of Public-Private Partnership

Research literature suggests that although the appeal for PPP all over the world is growing, systematic examination of the success and failure factors is limited (Jamali 2004b; Alinaitwe & Ayesiga 2013). The understanding of such factors will allow for the efficient allocation of scarce resources (Zhang 2005; Agrawal 2010) and the establishment of guidelines for PPP activities (Boynton & Zmud 1984). Such understanding is also required for the development of a workable and efficient PPP framework (Zhang 2005; Kwak et al. 2009). As observed by Milosevic & Patanakul (2005), critical success factors have a significant impact on the success of a project. Accordingly, many studies, therefore, focused on investigating the CSFs to improve the effectiveness of PPP as a service delivery model.

Critical Success Factors of PPP Projects

Rockart (1982) defines Critical Success Factors as "those few areas of activity in which favorable results are necessary for a manager to reach his/her goals" (Pg. 4, 1982). CSFs are those key areas that ensure the success of an organization or project (Kwak et al. 2009; Dulaimi et al. 2010; Alias et al. 2014). The CSF approach attempts to isolate key areas that are essential for management to achieve success. The CSF approach originated from management practice. However, it has been applied in financial services (Boynton & Zmud 1984); information systems (Rockart 1982); Textile industry (Asare 2012) and construction management (Jefferies et al. 2002).

Many researchers have identified different lists of CSFs of PPP projects based on review of other literature or through empirical studies. For instance, Akintoye et al. (2003) identified success factors that contribute to the achievement of the best value in (PFI) projects in the UK. Qiao et al. (2001) identified eight independent CSFs for Build-Own-Transfer (BOT) in China. Jefferies et al. (2002) identified CSFs from the reflection of an Australian stadium project. Zhang (2005) identified 47 CSFs for PPP projects at the international level. He later classified into five (5) main aspects of CSFs. Kwak et al. (2009) identified CSFs for PPP projects also from an extensive review of the literature (Table 1).

Table 1: List of CSFs in the Reviewed Literature

Author(s)	PPP Types	Regions	Critical Success Factors
Akintoye et al. (2003)	PFI	UK	Detailed risk analysis and appropriate risk allocation, drive for faster project completion, curtailment in project cost escalation, encouragement of innovation in project development, and maintenance cost being adequately accounted for
Qiao et al. (2001)	BOT	China	Appropriate project identification, stable political and economic situation, attractive financial package, acceptable toll/tariff levels, and reasonable risk allocation, selection of suitable subcontractors, management control, and technology transfer
Zhang (2005)	PPP	International	Economic viability, appropriate risk allocation via reliable contractual arrangements, sound financial package, reliable concessionaire consortium with strong technical strength, and favorable investment environment
Jefferies et al. (2002)	BOOT	Australia	Solid consortium with a wealth of expertise, considerable experience, high profile and a good reputation, an efficient approval process, and innovation in the financing methods of the consortium
Kwak et al. (2009)	PPP in general	International	Competence of the government; selection of an appropriate concessionaire; appropriate risk allocation between the public and private sectors; and a sound financial package

The Relative Importance of CSFs for PPP Projects

Many researchers have developed different lists of CSFs of PPP projects. However, while many factors are critical, it is quite obvious that the level of “criticality” of the identified factors varies in different places (Li et al. 2005). Accordingly, many studies have focused on investigating the relative importance of CSFs to enhance the understanding of PPP. For instance, Li et al. (2005) investigated the relative importance of 18 CSFs in the UK and concluded that the three (3) most important factors. Chan et al. (2010) investigated 18 CSFs of PPP in infrastructure development in China. The results of their study identified five underlying factors. Ismail (2013) examined the importance of 18 success factors for PPP implementation in Malaysia and established five top (5) CSFs. Hwang et

al. (2013) examined the relative importance of positive and negative factors influencing PPP projects in Singapore and discovered eight top factors. Babatunde et al. (2012) also considered the relevance of success factors between the public and private sectors in infrastructure delivery in Nigeria. The results of the study revealed eight critical success factors. Cheung, Albert P.C. Chan et al. (2012) compared the relative importance of 18 CSF for PPP projects in Hong Kong, Australia and the UK. The study indicated that while five CSFs are most critical in Hong Kong, the level of importance of those factors is quite different in Australia and UK (Table 2).

Table 2: Relative Importance of CSFs of PPP Projects

Author(s)	PPP TYPES	Regions	Top ranked CSFs
Li et al. (2005)	PFI	UK	A strong and good private consortium, appropriate risk allocation, and available financial market
Cheung et al. (2012)	PPP Projects	Hong Kong, Australia, UK	Favorable legal framework, commitment and responsibility of public and private sectors, strong and strong private consortium, stable macroeconomic condition and appropriate risk allocation and risk sharing are the five top success factors for Hong Kong
Ismail, S. (2013)	PPP Projects	Malaysia	good governance, a commitment by public and private sectors, favorable legal framework, sound economic policy, and available financial market are the top five (5) CSFs in Malaysia
Chan et al. (2010)	Infrastructure Development	China	Stable macroeconomic environment, transparent and efficient procurement process, shared responsibility between public and private sectors, stable political and social environment, and judicious government control
Hwang et al. (2013)	PPP Projects	Singapore	Well organized public agency, Appropriate risk allocation and sharing, Strong private consortium, Transparent procurement process, Clearly defined responsibilities, Clarification of contract documents, Favourable legal framework, Shared authority between public and private sector
Babatunde , et al. (2012)	Infrastructure Projects	Nigeria	Competitive procurement process, Thorough assessment of the cost and benefits, Favorable legal framework, appropriate risk allocation, Government guarantee, political support, stable macroeconomic condition, sound economic policy, availability of suitable financial market

From the review of the literature, some authors hold the view that certain critical success factors of PPP projects are common irrespective of geographic location. For instance, the success factor “Favorable legal framework” was found to be critical in both mainland China and Hong Kong (Cheung, Albert P C Chan et al. 2012). On the other hand, other authors (Zhang 2005; Brown et al. 2006; Mu et al. 2011) are of the opinion that critical success factors of PPP projects vary in different administrative settings. The authors argued that because CSFs are place-specific, their level of importance tends to

vary in different administrative contexts. Akintoye et al. (2003) also concluded that the achievement of optimum efficiency (success) in PPP projects is project-specific as the requirements for achieving it for one project may not be the solution for another. Although, the concept, process and key principles of PPP are essentially identical; many aspects of PPP are either project, sector and country-specific (Zhang & Chen 2013). As submitted by Zhang (2005), environmental peculiarities influence the success of PPP projects. For this reason, the relative importance of CSFs of PPP projects is determined by the specifics of political, cultural and institutional context (Mu et al. 2011; Brown et al. 2006).

REPORTING AND DISCUSSION

Many studies investigated and developed a different list of factors that are critical to the success of PPP projects. However, there seems to be an agreement on the relevance of some of the factors due to the recognition they received in the various literature (Table 3). The analysis records the number of times the reviewed literature mentioned each factor.

Table 3: Relevancy of CSFs of PPP Projects

S/N	Critical Success Factors	Authors													Frequency			
		1	2	3	4	5	6	7	8	9	10	11	12	13				
1	Competitive/Transparent procurement process		*	*		*	*						*					5
2	Transparent and efficient legal framework		*		*	*	*	*										5
3	Appropriate risk allocation and sharing					*	*		*	*					*			4
4	Strong private concessionaire	*			*		*		*	*								4
5	Judicious government control				*		*				*					*		4
6	Favorable investment environment		*	*		*				*								4

Authors

1-Jefferies et al. (2002), 2-Li et al. (2005), 3-Chan et al. (2012), 4-Abdul- Aziz and Kassim (2011), 5- Babatunde et al (2012), 6-Hwang et al (2012), 7- Ismail (2013), 8- Kwak et al (2009), 9- Zhang (2005), 10- Helmy (2011), 11- Zhao et al (2010), 12- Jamali (2004), 13-Tam (1999).

Similarly, the review presented two divergent views from the reviewed literature regarding the relative importance of CSFs of PPP projects. On one hand, proponents hold the views that CSFs of PPP projects are, indeed, common irrespective of geographic location. On the contrary; opponents maintained that CSFs are location-specific. For instance, Cheung, Albert P. C. Chan et al. (2012) compared the relative importance of 18 CSFs for PPP projects in Hong Kong, Australia and the UK (Fig 4). They observed that

the factor “stable macroeconomic condition” is considered top success factor in Hong Kong. However, the same factor was rather unimportant due to a relatively stable economic condition in Australia and the UK. Similarly, while respondents in Hong Kong also ranked “favorable legal framework” top success factor, respondents in Australia and the UK were not very much concerned about their existing legal framework. The ranking is because Australia and the UK have an already established legal system to handle PPP matters.

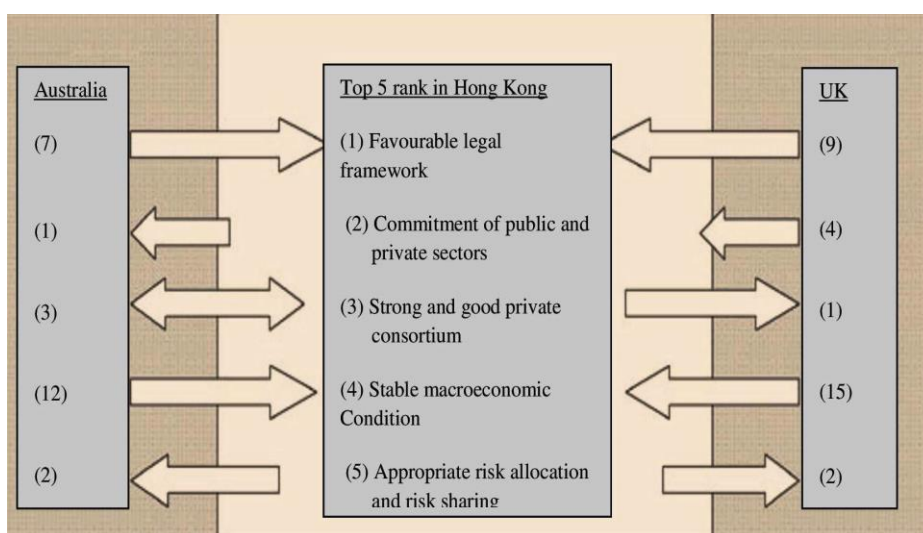


Figure 4: Relative importance of CSFs in Hong Kong, Australia, and the UK
 Source: Cheung et al. 2012

The two viewpoints have received credence in literature. However, another significant consideration implied from the reviewed literature is that of “time” dimension as an essential element that influences the criticality of CSFs for PPP projects. For instance, Mu (2008) attributed the failure of a highway project in China to time-related factor. He observed that the absence of adequate laws and regulations for PPP construction and operation in the 1980s caused the failure of “Shen-Da Expressway.” Similarly, Chan et al. (2010) identified the success the factor “macroeconomic environment” as very critical in a study in China in 2010. He, however, recognized that the level of criticality of the same factor is likely to change due to the then prevailing changes to the global financial climate. Similarly, Li et al. (2005) attributed the criticality of the success factor “favorable legal framework” to the absence of any specific law on PPP projects in the UK in 2005. However, Cheung, Albert P.C. Chan et al. (2012) discovered that the same factor “favorable legal framework” was not important in the UK seven years later. They ascribed the “change” in the importance of the factor to a well-established legal framework in the UK in 2013. For this reason, a factor identified as critical at a time, may due to changing circumstances, be no longer be of importance at a later date.

The identification of the “time” factor as a determinant of the relative importance of CSFs has far and wide reaching implications. The socio-political and economic systems of many countries and administrative regions are complex and dynamic. This complexity implies that simply focusing on a factor identified as critical for a particular PPP project in a particular context, may not guarantee the success of similar PPP projects in another context. Similarly, focusing on a factor identified as critical at a given time, may not guarantee the success of another PPP project in the same context at a later date. The continuous evolution of PPP procurement process, therefore, requires an ongoing evaluation of PPP projects so as to prioritize the relevant CSFs for efficient delivery of PPP projects.

CONCLUSION

This article distilled the CSFs for PPP projects and crystallized the various viewpoints concerning the relative importance of Critical Success Factors of Public-Private Partnership projects. The authors also argue that other than a project and location-related factors, the time factor also has a significant influence on the level of importance of the factors considered critical to the success of Public-Private Partnership projects. The paper buttresses the subjectivity regarding the significance of CSFs for Public-Private Partnership projects. Given this subjectivity, future studies on PPP projects may want to reassess the efficacy of the CSFs for PPP projects on a continuous basis. While this study has re-resonated the “timing” as a factor, solutions for improving PPP projects on this factor are limited. Future research agenda may, therefore, explore the influence and dynamics of “time-related” factors on the success of PPP projects.

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THE PROVISION OF VERTICAL SOCIAL POCKETS FOR BETTER SOCIAL INTERACTION IN HIGH-RISE LIVING

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Abstract

High-rise living makes it difficult for social communities to form despite the provision of several dedicated social spaces at ground, podium, mid- and roof-levels, partially due to the sheer number of residents per block. The pull of easily-accessed, solitary recreational activities such as surfing the Internet and watching television further exacerbates the problem. Social spaces need to be brought closer to residents to promote social interaction. This paper proposes to improve social interaction by supplementing currently stratified social spaces with vertically-connected social hubs using existing transitional spaces in high-rise living, such as the lift lobby, to create micro-communities comprising the residents of each respective floor in a cost-effective way. Previous research indicated that strong communities look after each other, indicating that the creation of micro-communities will create an effect not unlike the defensible space theory. Therefore, this paper analyses residential high-rise layouts based on chosen case studies in Malaysia, then suggests several possible design outcomes that turn the lift lobby into social spaces at every floor level.

Keyword: High-rise living, social interaction, social spaces, vertical connectivity

INTRODUCTION

High-rise living is fast becoming a dominant part of the urban fabric of Malaysian cities. New launches are overwhelmingly of stratified properties, totaling 20,892 units versus just 4,156 landed units in the second quarter of 2014 (NAPIC, 2014). Sites are planned for efficient land usage, maximising the number of units and essentially creating contained communities within each fenced residential scheme. These communities are easily hundreds of residents strong, and the definition of "community" becomes loosened to merely refer to a group of people who happen to stay in the same place, rather than "a body of persons or nations having a common history or common social, economic, and political interests" (Merriam-Webster, n.d.).

The myriad facilities available in residential blocks, which comprise common, shared spaces on ground, podium and select intermediate levels, do allow for socialisation among residents (Glaeser et al, 2012), but they are not enough. Our trips home are optimised for efficient, impersonal travel, from car to lift to home, with scant chances for social interaction. This is further compounded by high levels of mobility within our society (Kneis, 2009). With no opportunities to come in contact and no reason to

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purposely seek each other out, meaningful neighbourhood social ties (NSTs)¹ fail to form. Residents lose the chance to have a support network close at hand and feel no social connection to the place they call home. Social spaces need to be de-stratified, increased in quantity, more accessible, and closer to smaller groups of residents, yet at the same time be affordable to developers so that they will be willing to do it.

This paper focuses on residential high-rises in Malaysia priced between RM100,000 and RM400,000, which according to NAPIC's Q2 2014 report have the highest sales performances with take-up rates of more than 40% over the past three quarters. Specifically, the paper will look at the viability of developing vertical social pockets into generators of social interaction to create micro-communities comprising the residents of their respective floors.

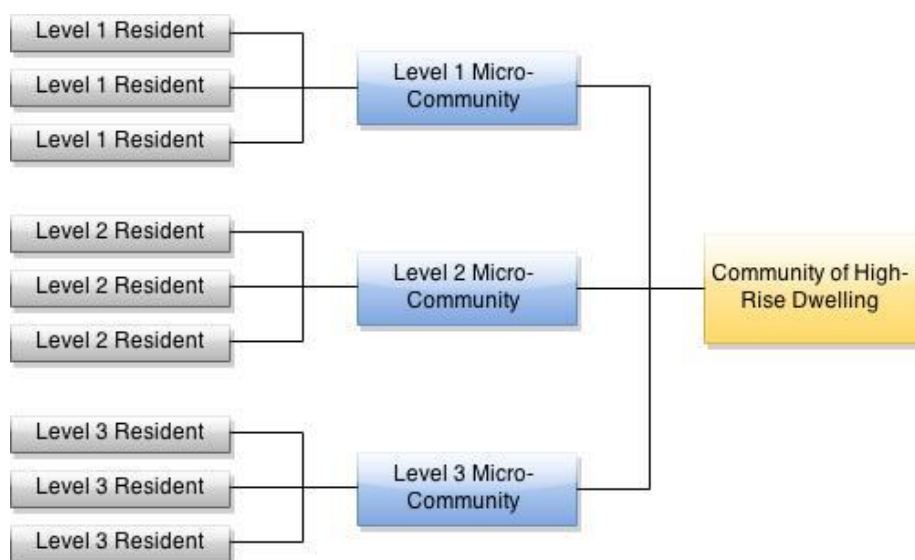


Figure 1: Simplified flow chart of how social relationships among residents can be built up and integrated

High-Rise, High-Density Housing in Malaysia

A housing environment can be evaluated in terms of its capacity to nurture and sustain social and psychological processes. Interior building design, spatial arrangements and neighbourhood (external or environmental factors) can have potential effects on the quality of spaces. In the context of high-rise residential projects in Malaysia, it is crucial that the hierarchy of different spaces are clearly defined so that it may facilitate the existence of various categories of public, semi-public, semi-private, and private spaces.

Unlike high-density housing estates in Singapore or Hong Kong, many high-rise residential projects in Malaysia have large building footprints, or site coverage. The site coverage of lower and affordable housing categories, which can be as high as 20% - 60% of the site, deserves special notice, being much higher than the 12% site coverage

¹Connectors of unrelated neighbours to become a neighbourhood (Kuo et al, 1998).

proposed by Le Corbusier (1932) and the 10% employed in some of the better public housing schemes in Hong Kong. As a result of this massive site coverage, Malaysian high-rise projects are dominated by concrete towers that suffocate open air-space within the site, which is relegated to building set-backs, roads, and other infrastructure requirements.

The pressure to cut costs and gain profits leads developers to demand maximisation of the sellable area of their projects and minimisation of unprofitable floor area, which refers to areas other than the residential units and accessory parcels, including the semi-public and semi-private transitional spaces in the building. From our observation, the public-private dichotomy in the high-rise, high-density housing environment is obvious. The private space that is the home ends where the long, narrow semi-public corridor begins. The abrupt convergence and inevitable proximity of these two spaces, joined by a short, semi-private foyer, exposes the private lives of the residents to casual surveillance and scrutiny from passers-by, and the awareness of this situation makes them disinclined to entertain strangers. Transitional spaces are designed to encourage passage and discourage meaningless lingering, but in the proper place and with careful design, they can also become social hubs as the potential for chance encounters in such spaces are high.



Figure 2 & 3: Existing hostile common spaces and lack of transitional spaces

A lack of social spaces can be stressful for the occupants of a building as it creates a sense of crowdedness. Crowding potentially affects the quality of living of the residents as well as the social cohesion of the community. The condition transcends actual physical space provisions; some of the effects observed include "lack of air, physical discomfort, restriction on movement, high temperatures, [and] odours" (Freedman et al, 1971). Studies of short-term crowding (experimental design that lasted a few hours) have shown that it negatively affects feelings and disrupts performance on complex tasks (Evans, 1979), while long-term crowding can result in lower frustration tolerance, which may translate into social withdrawal or aversion. However, the perception of crowdedness can be sensitively manipulated by design.

Fostering Social Interaction

According to Maslow (1954), humans are highly social creatures with a strong need to belong, so much so that society has the power to shape who we are (Stets et al, 2013). Social interaction during our formative years dictates, more or less reliably, our

behaviours and reactions when we are adults (Hazan & Shaver, 1987), and extreme cases of social deprivation result in feral children¹ who cannot function in society. We learn social norms from cues we receive from society, and we either conform to it and remain a member, or go against it and become deviants. So while the first major social institution to influence our lives may be our families, the community we live in by and large exerts its influence the moment we step out of our homes.

In return for our conformity, we become part of a social network² that guides and aids us. In the case of high-rise living, the closest and most constant community can be found among fellow residents. A strong social capital is beneficial for the community. Residents in communities with strong social capital look out for each other, find support groups among themselves, and cooperate for the betterment of the community. It also helps bolster the defensible space theory (Newman, 1972), in which residents become their own security, simply because they feel a sense of ownership of and care for the places around which they interact. According to Newman, "the high-rise elevator building forces more than 500 people to share a common building entry and interior circulation space. The exterior grounds and interior circulation areas are, as a result, anonymous and virtually accessible to anyone...The large number of residents complicates the recognition process among neighbours and discourages opportunity for the development of a commonality of goals and interests among them..." (Newman, 1976).

Evidence has shown that the structure and quality of social interactions have profound effects on psychological, behavioural, and physiological health and well-being (Taylor et al, 1997). Neighbourhoods are intermediate units of social organisation between the home and the city that allow individuals to experience a sense of community and hence improve social health.

Christopher Day (2002) suggested in his book 'Spirit and Place: Healing Our Environment' that the creation of links and nodes can help to generate activities for the community. Dr. Humphry Osmond, former Superintendent of Saskatchewan Hospital, coined terms to describe two basic kinds of spatial arrangements: 'sociofugal space', a space that forces people apart, and 'sociopetal space', a space that pulls people together. Many factors affect the probability and continuity of social interaction amongst members of a community. These include but are not limited to the propinquity effect, similarity, reciprocal liking, and physical attractiveness. These factors can be carried over to high-rise living. As many of these factors are uncontrollable, this paper intends instead to encourage several blanket encouragers of social interaction, specifically the propinquity effect.

Festinger (1950) conceptualised the propinquity effect, wherein the frequency of interaction between individuals heightens the chances of forming relationships, which also builds on the mere exposure effect, wherein mere exposure to a stimulus increases liking. Festinger's study is particularly interesting, as it drew a direct correlation between proximity between neighbours, and proximity between units and means of vertical circulation, to friendships among residents. Likewise, Fleming et al (1985) found three variables that improve social interaction:-

- i. Opportunities for contact
- ii. Proximity between apartments

¹ Feral children are human children who grew up without human contact, care, behaviour or language.

² A series of relationships that link one person to another.

iii. iii) Availability of proper places to interact

The findings of both Festinger and Fleming can be applied to increase the rate of social interaction of an increasingly time-pressed generation without pressuring them to socialise more than they can afford. In the arena of high-rise, high-density urban housing, where large numbers of strangers are forced to live together, provisions for group alteration of the environment is necessary for the development of a communal spirit amongst the residents. As Mitchell (1971) suggested, the organisation of the spaces outside individual dwelling units and buildings may be the key issue to address. Individuals can tolerate high densities in their place of residence, but the same densities may create a street environment that is socially unhealthy for the community. The creation of social pockets within the high-rise itself presents the opportunity to form small group spaces that can foster better social and communal interaction.

Current Housing Policies in Malaysia and Their Effects on Social Interaction Among Residents

Current housing policies already make the provision of open spaces (*kawasan lapang* in Malay) compulsory for residential projects, varying between 10% and 15% of the total land area depending on the state's Local Plan. The guidelines for the provision of common facilities are somewhat looser, as stated in the Draft Planning Guidelines for Common Facilities (2011) under the Town and Country Planning Department of Peninsular Malaysia (*Jabatan Perancangan Bandar dan Desa*, JPBD), stipulating requirements for only basic facilities such as kindergartens, prayer rooms and multi-purpose halls.

The introduction of a new housing type, the affordable housing unit, in December 2013, created new policies at both federal and state levels. The federal government has announced several policies that are expected to take effect within the next 5-10 years, most notably the PR1MA affordable housing project launched in 2012 under the PR1MA Act 2012, a nationwide endeavour to create 123,000 PR1MA homes by 2015. At state level, there are the Affordable Housing Scheme (*Skim Perumahan 100% Rumah Mampu Milik*) in Penang, RUMAWIP in Kuala Lumpur, and the My Home scheme in Kedah, among others, to meet the urgent need for affordable housing in Malaysia.

The guidelines for affordable housing schemes include provisions for facilities, including but not limited to open spaces, playgrounds, religious institutions, and so forth. These common spaces are hubs for social interaction and recreation. The concentration of so many different facilities in one place allows for the formation of like-minded social groups among residents via what Festinger et al termed "passive contact"¹.

According to Penang EXCO YB Chow Kon Yeow², the Penang state government is temporarily allowing a special density approval of 87 units per acre for affordable housing schemes in Penang, which is much higher than the typical 15 to 30 units allowed per acre. The reasoning behind this is that the higher number of units, in theory, translates into lower costs per unit that offsets the loss or lower profit margin for affordable housing units. It also means more houses for the masses.

¹Casual or involuntary meetings, according to Festinger.

²As per YB Chow Kon Yeow's keynote address at the Penang International Conference 2015 on behalf of Chief Minister YAB Lim Guan Eng at Setia SPICE.

However, such high density rates should be used in moderation and with caution. Traditionally, communities are smaller in number but more widespread. The inverse happens in high-rise residential living, more so in high-density ones. The high concentration of residents in one place can have an adverse effect on the formation of communities. Studies such as those conducted by McCarthy et al (1978), Baum et al (1979), and Evans et al (2000), have revealed that excessive crowding in high-density living results in social withdrawal¹, which is detrimental to social interaction. And if residents are unaware of who their neighbours are, high-rise living becomes ripe for crime (Conklin, 1971).

The categorisation of affordable housing projects by price directly limits the type of residents who inhabit them. The different price caps on LCs, LMCs and affordable housing units, and the different minimum total household income necessary to borrow loans to finance the purchase of such units, draws applicants from a specific economic stratum only. For example, a person must earn less than RM2,500 to qualify for an LC unit and RM3,500 for an LMC unit on Penang island, so all residents - assuming they are the owners of the units, as should be - come from that income bracket. This creates a homogeneous community that is both good and bad: on one hand, residents can interact knowing that no one is "better than thou", but on the other hand they may be stuck with certain unpleasant stigmas. For instance, low-cost housing are often associated with lack of hygiene and upkeep, and with a glut of foreigners or otherwise uncouth, perceived dangerous people, when in reality there are also people who are simply making do living there until they can afford a better place to stay.

OBJECTIVES

The objectives of this research are:

- To increase social interaction among residents in high-rises.
- To locate more areas in high-rises to be turned into social spaces.
- To take a step-by-step approach towards creating cohesive communities in residential high-rises.

APPROACH

The purpose of this research is to locate and design social spaces conducive for social interaction to create micro-communities comprising the residents of their respective floors. The investigation draws upon literature reviews regarding community and social interaction, as well as a case study of a successful residential social space. It also analyses recent residential high-rise launches in Malaysia priced between RM100,000 and RM400,000, as per the scope of this study, to determine the most common high-rise layouts for residential high-rises within this price range in Malaysia. These data are then used to locate the most appropriate location for social interaction on each floor. Suggestions on how to design the space to make it interaction-friendly is proposed at the end of this study.

¹A retreat from society and interpersonal relationships that may be accompanied by indifference and aloofment.

ANALYSIS AND DISCUSSION

Case Study: The Traditional House Porch

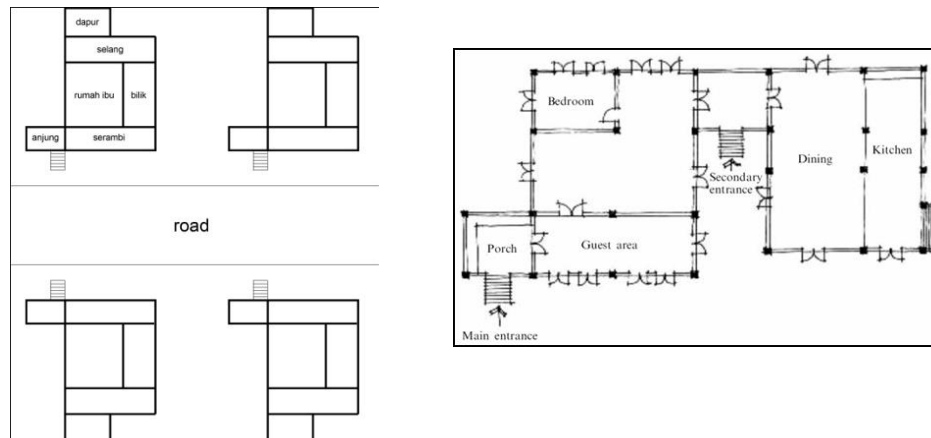


Figure 4 & 5: Layout of traditional Malay houses

Before malls and cafes became the destinations of choice for those who wish to mingle, the traditional house porch was the closest and most numerous space available for social interaction. In the traditional Malay home, the porch and its entrance, or the '*serambi*' and '*anjung*' in Malay, is where guests are entertained, and it is normally attached to the front of the house and accessible by a flight of stairs. The '*anjung*' has no walls, only railings. Visitors are greeted in the informal, semi-public '*serambi*' before being invited into the main living area, or '*rumah ibu*' in Malay.

The open nature of the space allows for both active and passive interaction to occur, as everyone is in full view of the streets beyond the house, thus heightening the mere exposure effect even if the interaction consists of just a smile and a greeting. Villagers can drop by if they see their friends on the porch. Residents and their guests will also be able to have their eyes on the streets (Jacobs, 1961), a territoriality that makes the street both safe and humanly welcoming. If the porch is seen as an extension of the street, it becomes a place to pause and linger while staying connected to the main street life.

The ability to visibly recognise individuals as neighbours and to relatively freely visit other villagers' houses leads to high social interaction and meaningful relationships among residents. By being so close to the street front, the porch provides ample chances for chance encounters with both familiar and unfamiliar individuals, thus creating a third place atmosphere that 'anchors' community and fosters interaction (Oldenburg, 1989). These transitional spaces are not unique to local vernacular houses. In other types of conventional housing, a front gate, yard, and vestibule, with windows overlooking the approach, provide warning, preparation time, and vantage points to its dwellers.

Common High-Rise Layouts in Malaysia

This study attempts to identify high-rise layouts commonly used in Malaysia, derived from a random sample from five states with the most new launches of residential units as of Q2 2014 in NAPIC's Property Market Status Report, namely Selangor, Penang, Johor, and the Federal Territories of Kuala Lumpur and Putrajaya. All residential high-rises analysed were launched between 2005 and 2015, and priced between RM100,000 and RM400,000, in line with the scope of this study. In general, these high-rises have above-ground, multi-storey car parks, a single lift lobby, and are topped by common facilities at podium level. A few high-rises also sport common facilities at intermediate and roof-top levels of the building.

The sandwich block

Upon analysing the new launches in all five states, it is discovered that an overwhelming majority of the new launches utilise the sandwich block, which has a double-loaded central internal corridor flanked by residential units on both sides and punctuated by air-wells. In recent years, units within this price range have tended to be below 900 square feet, with three bedrooms and two bathrooms.

The sandwich block is highly efficient in terms of circulation and unit density, resulting in space optimisation which will allow for the construction of more residential blocks within the same parcel of land. Given all the above, it is, therefore, an unsurprising choice of layout for developers who would prefer to maximise the number of units constructed to achieve economies of scale. In this configuration, the lift lobby is usually in the centre of the building layout and the combination of the lifts, staircase and lift lobby takes up one or two column bays. Depending on the span of the bays, this may translate into a narrow lift lobby, although by its location often means that it receives direct sunlight and ventilation from at least one side. The corridors may be dim, especially on the lower floors which have lower sunlight penetration levels.

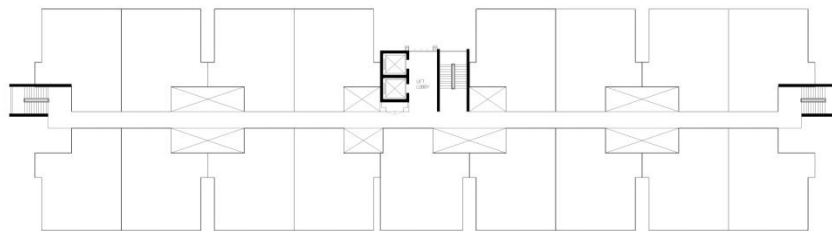


Figure 6: The sandwich block

The point block

The lift lobby is at the heart of the point block layout. Multiple residential units append to this central core on all sides, linked by a corridor that rings the core for a highly-optimised circulation route. The residential units in point block high-rises tend to receive ample amounts of natural lighting and ventilation from external facades as they surround a relatively small core. The short corridor and the close placement of units, which eliminates the need for a third staircase normally required to comply with the dead-end

running distance requirement set by the Fire and Rescue Department of Malaysia (*Jabatan Bomba dan Penyelamat Malaysia*), potentially translates into cost savings for the developer, who can also benefit from selling their units as having low densities per floor.

The lift lobby in this layout appears bigger due to its seamless connectivity to the corridor around it, and this configuration allows for a wider range of social interaction design interventions. However, as it is situated in the middle of the building layout, it may appear dark and unwelcoming as it receives lighting and ventilation mainly, or solely, from the air-wells around it. The transition from public to private space is especially abrupt.

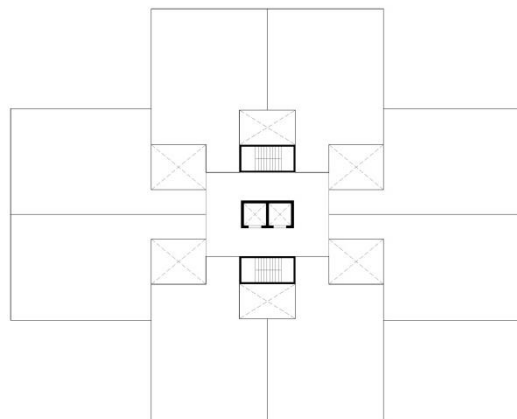


Figure 7: The point block configuration

The single block

Unlike the sandwich block, which has a double-loaded corridor, the single block utilises a single-loaded corridor in which residential units are laid out on only one side of the corridor. This layout has become increasingly uncommon in recent years as it is, theoretically, only half as efficient as a sandwich block. Regardless, it is still used to suit narrow site constraints that are unable to accommodate wider types of high-rise blocks.

Its transitional spaces receive ample natural lighting and ventilation and as such appear wide and airy. It can also act as a point of convergence if the single block layout is bent to fit the site, with the added benefit of aggrandising the lobby in the otherwise awkward pocket of space created by the manoeuvre. As such, transitional spaces in single block layouts stand to be more welcoming and generous than other layouts.

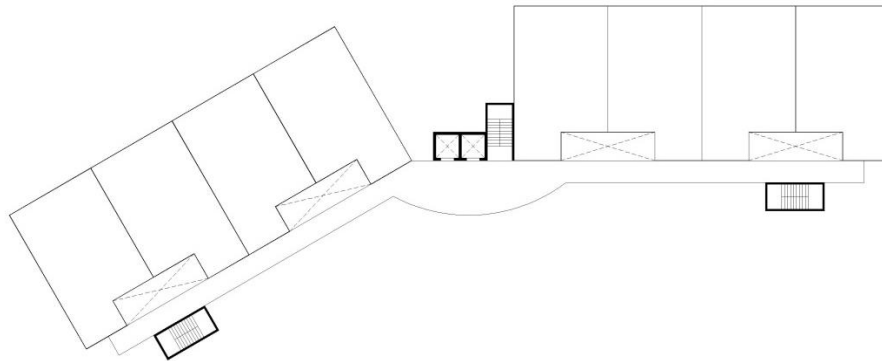


Figure 8: A single block

Hybrids

Several combinations of the above examples exist, although like the single and point blocks, it is less common than the sandwich block. For example, a combination of single- and double-loaded corridors can be used for irregularly-shaped sites.

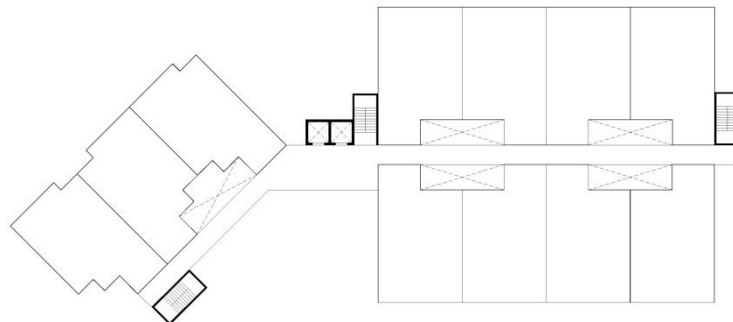


Figure 9: An example of a hybrid block

An Analysis of Existing Common Spaces in Residential High-Rises

This study proposes to discover a cost-effective way to enhance the sociability of an existing common space in residential high-rises. The semi-public spaces under consideration include green areas, ground-level and podium-level common facilities, transitional spaces such as corridors, staircases, lobbies, as well as service spaces, specifically car parks, as these spaces experience foot traffic and are, therefore, candidates for social triggers in high-rise dwellings.

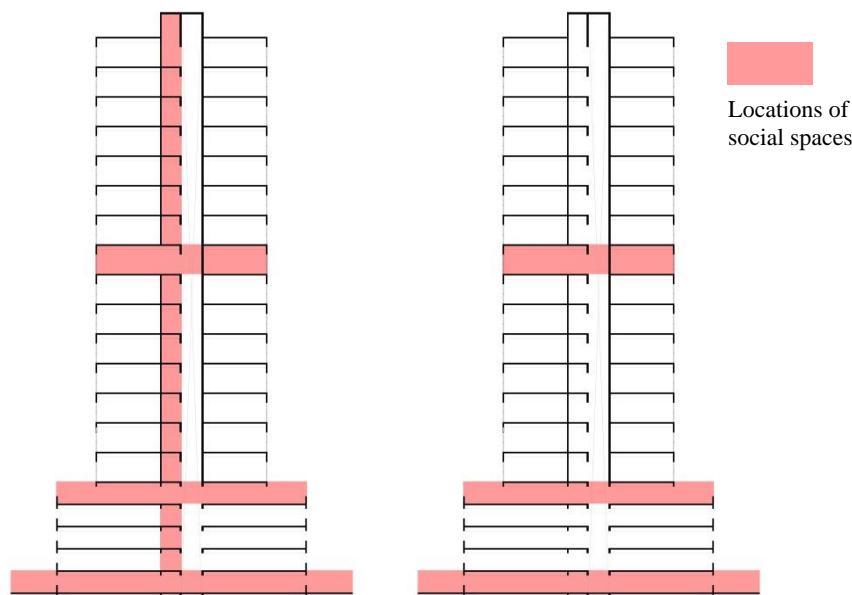


Figure 10: Current locations of social spaces & Figure 11: Proposed continuity and frequency of social spaces using existing common spaces

The comparison criteria are adapted from Nugent's (2012) research on successful residential common spaces and derived from Maslow's Hierarchy of Needs (Maslow, 1954), which groups human needs into three categories and five levels: basic needs comprising physiological and safety needs; psychological needs comprising sense of belonging and self-esteem needs; and self-fulfillment needs comprising self-actualisation. Maslow (1954) posits that one has to satisfy a lower level need before meeting a higher one; for example, one has to fulfil one's need for shelter before one considers a need to belong. However, this paper will consider instead the ability of a common space to fulfil those needs, as in this case the physical environment will provide the means to do so and its utilisation is up to the residents. The last level of self-actualisation will also be disregarded as it is a culmination of achievements of the lower levels and is subjective for every person.

Basic needs criteria

i) Visibility and openness

The ability to see and to be seen from one's current location is a measure of safety and security. Residents will be able to see anyone coming and going from a space, and as passers-by they may choose to drop in and be involved with activities in the space if they are interested. The visibility of the space from main circulation routes will also be taken into consideration.

ii) Distance from daily travel path

The more frequented a space is, the safer the space is perceived to be, as residents assume that the presence of witnesses will deter deviant behaviour and in extreme

cases, crime, as popularised by Jane Jacobs (1961) with her “eyes on the street” theory. Spaces along the daily path of travel of residents also tend to be used more often, thus increasing opportunities for socialisation (Blossom & Thompson, 2015).

iii) Effective reach

The spaces will be evaluated on their effective reach, whether macro (the entire residential high-rise) or micro (only residents in a localised area, such as a single floor).

iv) Noise tolerance

While ownership and residency of the housing units fulfils the physiological need for shelter, residents also require rest (Maslow, 1954), and as such, the noise tolerance of the common spaces under consideration will also be evaluated based on distance from residential units and observed noise-dampening ability.

Psychological needs criteria

i) Possibility for multiple activities to take place

The ability to conduct a variety of activities in a space, from simple conversations to recreational or interactive activities, can contribute towards increasing belongingness and self-esteem. A space that can cater for several different activities will appeal to a wider range of residents.

ii) Possibility of personalising a space

A sense of belonging can also be fostered when residents are given the freedom to personalise a space. It could be as simple as the ability to rearrange furniture to facilitate conversation or to place a vase of flowers. This gives residents the opportunity to take up responsibility for the space and thus for territoriality to form (Newman, 1972).

iii) Quality of space

The ability of the space to create a third place atmosphere (Oldenburg, 1989) – a relaxed, welcoming and friendly environment conducive for conversation – includes the degree to which it is naturally lighted, pleasingly coloured, and comfortably furnished (Nugent, 2012). Residents will be more likely to use a space if a satisfying quality has been achieved.

Based on these seven criteria, the existing semi-public spaces available in residential high-rises are evaluated for their suitability to be enhanced as a social space conducive for the formation of micro-communities. The findings are summarised in the table below:

Table 1: Evaluation of existing semi-public spaces in residential high-rises.

Semi-public space	Visibility & openness	Distance from daily travel path	Effective reach	Noise tolerance	Multi-activity space	Space personalisation	Quality of space
Green area	High	Moderate	Macro	High	Yes	Yes	Good
Common facilities	High	Moderate	Macro	High	Yes	Yes	Good

Corridor	High	Negligible	Micro	Low	No	Limited	Moderate
Staircase	Moderate	Negligible	Micro	Moderate	No	No	Poor
Lift lobby	High	Negligible	Micro	Moderate	Yes	Yes	Moderate
Car park	Moderate	Moderate	Macro	High	No	Limited	Poor

Out of these existing semi-public spaces, this study chooses to improve upon the lift lobby as it fulfils the aim of the study by targeting residents at a micro level at their respective floors, in addition to being highly visible and part of a resident's daily travel path. The increased space afforded to it as the connecting point for corridors emphasises its importance as the nodal point of the floor and allows for some degree of simultaneous varied activities, which makes it a natural sociopetal space for residents living on any particular floor.

The Lift Lobby as an Engine of Social Interaction

Ample research has been conducted on social interaction in multi-family dwellings (Festinger et al (1950); Glaeser et al (2000); Fleming et al (1985)). Outdoor common spaces have received considerable attention (Kuo et al (1998); Farida (2013); Bouma et al (2010)). However, a micro view on the definition of "community" may be more prudent in view of the growing number of residents per apartment building.

Fleming's findings are partially echoed by Williams (2005), who discovered that positioning a common room centrally in the building layout will encourage more residents to use it. However, the provision of yet another designated common space, and on every floor at that, may strongly deter developers whose profits are already dampened by the construction of price-controlled affordable housing units. The next logical step, then, is to locate existing, under-utilised spaces that are 'central' to the building itself, even if they are not physically in the centre of the building layout. This centre can be perceived as the heart of vertical circulation routes present in all high-rise living, namely the staircase but more commonly, the lift. The lift lobby also fulfills Festinger's conditions for social interaction, as it provides space for chance meetings.

Birchall (1988) discovered an inverse relationship between the size of a residential community and their inclination to use common spaces. The smaller the group, the more likely they are to use the common space and take part in communal activities. Birchall's study casts some doubt on the effectiveness of ground- and podium-level facilities so commonly found in residential high-rises. These facilities are large, meant for all, and used by all, so according to his findings, residents may be less inclined to use them for communal activities, although they may still use them for personal recreation.

Based on these key findings, it can be assumed that the converse also holds true: reducing the number of residents that use a common space which is located centrally in the building will encourage them to use the spaces, thereby promoting social interaction and networking. It is much easier to get to know two dozen neighbours living on the same floor than two hundred residents living in the same block. As both reducing the number of residents per residential project and partitioning common facilities into many smaller blocks are unfeasible and unreasonable, this paper suggests working on creating micro-communities comprising residents of their respective floors, with the lift lobby, an existing, must-use space for circulation, as a cost-effective communal space for social interaction.



Figure 12: Under-utilised space: an existing lift lobby in an apartment



Figure 13: Under-utilised space: an existing lift lobby in an apartment

Suggested Design Interventions

Furnished lift lobbies are not revolutionary; in fact, they have been used extensively in hotels and corporate offices. Foyers and lift lobbies create the perfect opportunities for place-making indoors. Designers have begun to realise the possibilities of turning such lift lobbies into happening spaces, and it shows in the various wall treatments, light manipulation, furniture and even game areas that have been set up for recreational purposes. A rudimentary effort can sometimes be found in the ground floor lift lobbies of higher-end high-rises in the form of seating and the use of materials.



Figure 14: A single bench at the ground floor lift lobby of a condominium in Kuala Lumpur

This particular innovation, however, has yet to be implemented at a micro scale even in luxury homes, much less in lower end or affordable housing schemes. As such, the lift lobbies designated at every floor are under-utilised and redundant for the better part of the day, especially since residents only use it for a few minutes while waiting for the lift to arrive. In sandwich block high-rises, the lift lobby is a prime location for communal activities by simply being wider than the corridor it serves. The extra width allows people to linger if provided the opportunity and incentive to do so, which serves to expose the lingerers to residents coming to and from the lifts, triggering the mere exposure effect.

The first step is to create a place for them to interact, which gives them a reason to linger longer. In a way, the lift lobby can be re-invented as a public living room for residents who wish to chat without bringing regular friends into the inner sanctum of their home. These design interventions need not take up much space. One simple, straightforward way to do that is by installing benches or chairs parallel to or facing the lift lobby so that residents may sit there to rest or chat. Potted plants can be used to enliven the space and mark the pocket 'boundary' for social interaction. Likewise, the colours and materials used for the floor can be used to delineate the social space from the normal flow of circulation. Low walls at the exterior end of the lift lobbies can be reimagined as magazine racks, herb gardens, and so forth to create opportunities for small community projects. If the lobby is wide enough, furniture can be arranged to create several pockets of space for several small groups to converse at the same time. Portable furniture can also be used so that residents may create their own space to suit their needs. Besides being inspired by the living room, the lift lobby can also take cues from cafe design. Chairs, benches, and tables of varying types and heights can be used to accommodate different users. Power outlets can be installed for the convenience of laptop users. A counter-top

can even be installed as a make-shift communal pantry and double up as a discussion table when the situation calls for it.

Below are several possible interpretations of the lift lobby as an enabler of social interaction. There are endless configurations to be explored; the images are but a few illustrations of the ability of the lift lobby to become more than just circulation space.



Figure 15 & 16: Redesigned lift lobby with a narrow width by adding built-in furniture and demarcated zones with differentiated materials, using the lift lobby layout from Figure 6.

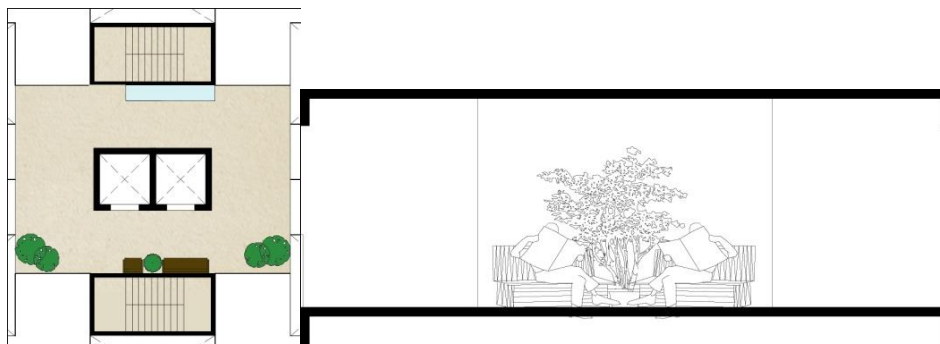


Figure 17 & 18: Redesigned lift lobby with a narrow width by adding built-in furniture and demarcated zones with differentiated materials, using the lift lobby layout from Figure 7

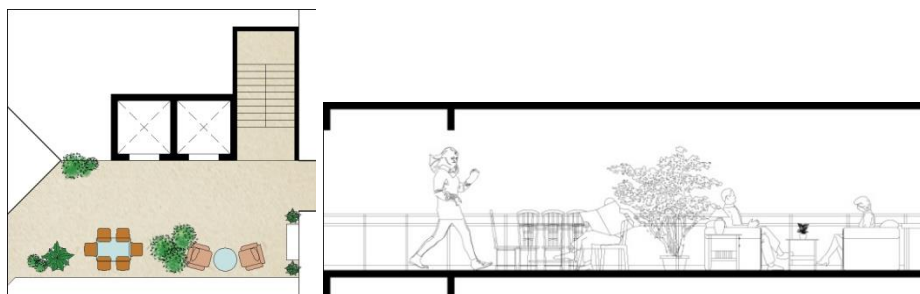


Figure 19 & 20: Redesigned lift lobby with fixed and portable furniture, plants, a counter-top, and power outlets, using the lift lobby layout from Figure 8

CONCLUSION

This study addresses the limited effectiveness existing stratified social spaces in creating social relationships among residents of high-rise dwellings. Various studies have shown that 'less is more' when it comes to the capability of a designated social space to promote meaningful, lasting interaction; keeping the spaces small but numerous will allow for the formation of more micro-communities. The spaces need not be dedicated for social interaction; they can occur anywhere there are redundant, visible spaces in the building, such as the lift lobby, which is currently under-utilised as merely a transitional space. The lift lobby is a prime location as it is in the middle of the building in sandwich block layouts, the most common layout found in high-rises priced between RM100,000 and RM400,000. It can be furnished to encourage lingering and increase passive contact among residents. Once micro-communities have had the chance to form, further studies will be required to further unify the residents, from being parts of a micro-community to a part of a whole vertical neighbourhood.

It should also be noted that the proposed design intervention is minimal and can be implemented even in existing buildings. Such simple but purposive intervention can possibly address the single-use redundancy of transitional spaces, improve semi-public spaces, foster social interaction, and create a harmonious rapport among high-rise residents. With the current phenomenon of large building footprints and site coverage prevalent in Malaysia, which constrains the horizontal development of better social spaces, an alternative would be to grow upwards; the creation of sociopetal vertical social pockets via lift lobbies is one that can be easily incorporated. Further studies and innovations need to be brought in, in order to enrich the social fabric of residents.

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THE RUKUN WARGA-BASED 3RS AND WASTE BANK AS SUSTAINABLE SOLID WASTE MANAGEMENT STRATEGY

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Abstract

Communities store a potential power to support overall performance of urban solid waste management through various creative and innovative arrangements. In Indonesia, the Rukun Warga (RW) is the lowest hierarchy of community organizational system which can implement creative and innovative arrangements to support solid waste management activities with less financial requirement. This study observed RW-based activity on fifty RWs with 412 respondents in terms of 3Rs, household waste separation, waste recycling business and waste bank system undertaken by the community for the sake of cleanliness and income-earning. The result shows that the correlation between level of the activity of the RWs communities in undertaking 3Rs, recycling business and waste bank, and the perceived cleanliness by the community members was validated. It is also showed positive results such as improved urban environment and provided strong push-factor influencing the community members to join the movement and the activities towards sustainable solid waste management are not always cost-intensive activities but a socially-bounded engagement would also workable.

Keyword: Rukun Warga (RW), 3Rs, community-based solid waste management, waste separation, waste bank, cost-intensive waste management

INTRODUCTION

The division of administrative regions in Indonesia on the first level according to the Constitution of the Republic of Indonesia 1945 Chapter VI on Local Government, Article 18, and Paragraph 1 is a provincial unit. A provincial unit is divided further into districts (*Kabupaten*) and municipalities (*Kota*) that have an equivalent level, then a district is divided into sub-districts (*Kecamatan*). The lowest administrative division of a sub-district in a municipality is wards (*Kelurahan*). At the same level with a ward, the sub-districts in a district is divided into villages (*Desa*). *Kelurahan* and *Desa* are thus the lowest formal administrative and political division.

In the context of non-formal sub-division, *Rukun Warga* (RW) is the lowest level of territorial division. The RW is under the *Kelurahan* or *Desa*. Thus, the *Kelurahan* or *Desa* may consist of several RWs depending on geographical condition and population size of the *Kelurahan* or *Desa*. This is a non-formal territorial sub-division, because they

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are not accommodated in the Constitution and its formation is rather through local community meetings set by the sub-district or *Kelurahan* or *Desa*. RW is led by a chairman elected by citizens as government partners in maintaining and preserving the values of a society that is based on mutual cooperation and kinship as well as help improve the smooth administration tasks such as implementing a sustainable waste management through 3Rs and waste banks. The study area, the Makassar City consists of 14 districts, 143 sub district, 971 RW, and 313,168 households (Central Bureau of Statistics of Makassar, 2013).

The study area, is one of the cities with insufficient solid waste management system in many aspects. As a result, policy and implementation of SWM in the context of developing city have not been appropriately established. The absence of appropriate policies on sustainable development in the proposed study area has led to a situation where the city is leading towards wrong direction away of green and clean city.

The local government of Makassar city is currently facing various issued related to solid waste management putting the environment at risk. The environmental risks identified are (1) the volume of waste generated in Makassar City is continuously increasing, (2) insufficient policy and legal aspect pertaining to sustainable solid waste management (3) the poor implementation and operationalization of government policies related to solid waste management particularly the cooperation between the local government and the community, and (4) poor quality and inadequacy of solid waste transportation, including insufficiency in financial support for a comprehensive sustainable solid waste management program by the local government. More often, the equipment such as truck containers are ageing, with no container cover causing wastes to scatter on the street while transporting, and it emits bad odor. Another issue on solid waste collection by the government is the inconsistency frequency of collection of wastes from the sources (Dilla and Natsir, 2007).

We observed that in Indonesia, the issue of SWM is seemingly a major concern at all levels of government, as local government yet unable to accomplish sustainable solid waste management practices, perhaps due to some constraints like institutionalizing operational policies, inadequate financial support, and the availability of infrastructure related to SWM (Meidiana and Gamse, 2010). However, a few of sustainable solid waste management (SWM) practices are presently in place in some cities in Indonesia such as Makassar City. In case of Makassar City, the activities were initiated by the RW organization.

SOME ASPECTS OF SWM PRACTICES IN THE STUDY AREA

There are numerous practices in sustainable solid waste management, where one of the easiest and most practical activities is the Reducing, Reusing and Recycling or 3Rs. However, these 3Rs would not take place without waste separation at first place, particularly at household level where the primary source of municipal waste originates. Visvanathan et al., (2007) argued that even this activity is easy, most people in cities in developing countries do not carry out this activity because of numerous reasons such as lack of knowledge and awareness, motivation, attitude, availability of supporting facility, incentive and opportunity. By this reason, the municipal SWM implementation is hampered persistently.

The collection of municipal solid waste has been identified as a major problem since in many areas municipal authorities are either unable or unwilling to provide waste collection services to all residents in their jurisdiction. On average, up to 50% of residents lack collection services in urban areas of low and middle income countries (Parizeau et al., 2006). There are limited opportunities for the development of a sustainable SWM systems as government budgets are limited and more than often, collection is overlooked; only the proper disposal of solid waste is perceived as representing a cost (McBean et al., 2005).

As a comparison with developed countries, Bai and Sutanto (2002) identified that the introduction of the centralized refuse-chute method has basically improved the efficiency collection of domestic household waste. This method has also increased the control on smell and leakage of refuse during the collection and transport of wastes. Moreover the authority has employed solid waste incineration process. Presently, Singapore incinerates 73 % of the total waste which is tantamount to 8,000 tons per day, while the remaining 27 % goes to the sanitary landfill. Over the years, the volume of solid waste incinerated has increased from 1.18 million in 1990 to 2.44 million tons in 2000. On the other hand, in developing countries the practices are largely depending on the households as the primary generator of municipal wastes.

We assert that waste segregation at household level is a key factor that leads to sustainable municipal waste management system because of some reasons. Firstly, 3Rs has a multiplier effect towards zero waste; secondly 3Rs would not be successful without the presence of fundamental activity i.e. waste separation at source; and, thirdly, zero waste is an eventual goal of sustainable SWM. By these reasons, we argue that SWM activities at RW level is interesting to investigate further.

Matter et al. (2013) stated that the waste segregation is a separation process of the entire waste generated, and it must be done at the very initial stage of overall SWM process. Thus, waste separation at source i.e. at household level is the most economically efficient ways of undertaking sustainable SWM. Waste segregation is commonly done based on the compositional makeup of the waste. Waste segregation ensures safety and enhances recycling ability of waste material that is of key to sustainable solid waste management (Ryu, 2010).

According to World Bank (2007), in most developing cities in Asia, the impending factors towards the implementation of sustainable SWM include lack of support from the local government, insufficient incentives, lack of willingness to implement sustainable SWM from the authority side, and lacks of awareness and feeling of sacrifice from the community side. These have made the solid waste management activities are limited. The community can only do selling the recyclable waste, not even a continuous waste segregation regardless whether or not recyclable wastes exist. There is actually a potential towards zero landfill through gradual change of habits of the waste management stakeholders such as the community or the neighborhood, the government and the business sector. This is also happening in Makassar.

In Makassar city and most cities in Indonesia, the handling of waste is still using the collection, transportation, and disposal in landfill site. The solid waste is collected from the source and then transported to temporary dump site and finally dumped in a landfill. It is therefore far from sustainability principle. Sustainable SWM strategies are thus needed to be pondered and practiced in a sustainable manner in the city. In this case,

the initial strategies that can be applied include reducing the volume of waste by processing waste into useful products is one method that is very necessary. Reducing waste in household can be done by collecting all wet waste that food scraps and vegetable directly entered into the composter every day. As for the recycling process can be prepare large size plastic bag for separate waste paper, plastic, aluminum, glass, and metal.

Currently, waste management strategies implemented at RW community level is mostly waste separation, recycling and waste bank system. In Makassar, it is recorded only 2105 house hold (HH), or about 1% HH conducting voluntary waste separation (Yayasan Peduli Negeri, 2013) whereas the number of HH on Makassar is as much as 313,168 (Central Bureau of Statistics of Makassar, 2013). To support the current strategy, waste segregation becomes very important, otherwise recycling and waste bank may not be able to implement. Separation should be done at the waste generators such as household, schools, offices, community health centers, hospitals, markets, and other places where human living. At each place, it can be prepared at least three activities - four bins are coded, i.e. the bins for rubbish that can be decomposed by microbes (organic waste), the bins for plastic waste or similar, the bins for cans and bottles

Nowadays, Makassar City generates about 5,224 m³/day of waste from the entire city (Central Bureau of Statistic of Makassar, 2014). Public Cleansing Department of Makassar City, a city department that is responsible to carry out SWM, stated that the Final Disposal Site (FDS) Tamangapa approximately receives 2,089 m³ of waste per day. Of the total volume waste generated, there only a maximum of 80% could be collected, hauled and handled by the government's SWM Agency. The FDS Tamangapa is the only landfill site in the city so far. The remaining waste of 20% is left uncollected. There are left on street, backyards and water bodies. The most common means of dealing with this waste is by burning it or dumping it to the unused land, in rivers and canals. This has serious environmental consequences, such as local air pollution and increase incidence fire and flooding.

The wastes generated in urban Makassar is generally organic as shown in Table 1 where 72% while 28% of the waste are non-organic, such as plastic and paper, among others. With the projected population of 2.2 million in 2015, and the average assumption of 0.3 m³ of waste per day, it is estimated that there will be a total of 4.188m³ of waste generated per day (Pasang et al., 2007).

Table 1: Waste Generation and Composition of Makassar City Year 2009 – Year 2013

No	Waste Generation and Composition	Year 2009	Year 2010	Year 2011	Year 2012	Year 2013
1.	Volume (M ³)	3.680.03	3.781.23	3.923.52	4.057.28	4.188.26
2.	Organic (%)	79,98	76,98	74,81	72,72	71,59
3.	Inorganic (%)	29,02	23,02	25,19	27,28	28,41

Source: Public Cleansing Department, 2013

Each household must pay the cost of collecting garbage after garbage collection is done by RW. Each household pays a monthly basis starting from approximately USD 1.5 - US \$ 3.0, based on the household size or house size or income level. In addition to the cost of garbage collection, there is also the cost of transportation and waste disposal. Total costs for transportation and disposal costs depend on the land area of housing.

The focus of this study is Makassar City in the eastern part of Indonesia. Makassar, formerly known as Ujung Pandang, has a land area of 175.77 km². In 2010, the city has a population of 1.339 million. It is the capital city of South Sulawesi and the fourth largest city in Indonesia. The city serves as the business and trading, education, agriculture, and financial hubs for the eastern part of Indonesia. The overall study involving household solid waste segregation occurs in 14 districts in Makassar, namely: Rappocini, Makassar, Tallo, Tamalanrea, Manggala, Biringkanaya, Tamalate, Mariso, Makassar, Bontoala, Ujung Tanah, Mamajang, Wajo, and Ujung Pandang.

Like any big cities in Indonesia, most waste management authorities only look into the cleanliness of the city just as the final product of SWM, without entirely evaluating the process of SWM itself, whether or not it is the best and correct path towards sustainable solid waste management. One point on solid waste management in Makassar is that, the conventional basic SWM practices are still in place. Although there is a potential point for the city towards the sustainable of solid waste, a concerted effort by multiple stakeholders is necessary (Meidiana and Gamse, 2010).

METHODOLOGY

This study was undertaken by doing ethnographic observations, structured interview with selected respondents and community leaders as well as distributing questionnaire to randomly selected respondents to understand their perceptions on the cleanliness of the community. By understanding the perceptions of the cleanliness of the surroundings, we then can correlate the perceived cleanliness with the sustainable SWM activities undertaken at the RW level.

Number of respondents (sample size) were calculated according to formula of $n = N / (1 + N * (e)^2)$, where N: population size and e: error. In this case, with confidence level of 95% one-tail, the error is estimated to be 5%, the sample size is then 400. The response rate was such that there were 412. The questionnaire was distributed manually and collected within a week or two. Interviews were done with 40 selected respondents, i.e. mostly the champions of the sustainable SWM practices within the community. Key persons within the City Department of Cleanliness were also interviewed to obtain their opinions about solid waste management.

The number of populations in the Districts within Makassar City, number of households, number of households those are presently active practicing sustainable solid waste management activities, and level of sustainable solid waste management practice, as well as sample size is shown in Table 2. The level of sustainable solid waste management practices is measured by the number of households those are currently practicing sustainable solid waste management such as waste reduction, waste separation, waste bank and 3Rs at household level, per 1,000 population of the district where the households located. By this indicator, the more number of households practicing sustainable SWM the higher the contribution of the district towards sustainable SWM at city level. It is therefore a rational indicator to reflect the level of SWM practices at the household level.

Table 2: Number of Population and Households those practicing sustainable SWM

No.	Districts/ Townships	No of Population	No of House- holds	Number of households actively practicing SSWM (SSWM Households)	Level of SSWM Practices*	Respondent	
						Min · Sam ple	Acquired Sample
1	Biringkanaya	195,906	42,458	106	2.50	51	54
2	Bontoala	52,631	11,405	50	4.38	14	17
3	Makassar	81,054	17,565	108	6.17	21	21
4	Mamajang	58,087	13,365	90	6.77	16	16
5	Manggala	130,943	27,247	110	4.04	33	37
6	Mariso	56,578	12,457	66	5.32	15	18
7	Panakkang	144,997	34,791	340	9.77	42	42
8	Rappocini	156,665	35,449	392	11.07	42	45
9	Tallo	138,419	28,253	516	18.30	34	35
10	Tamalanrea	108,984	32,292	70	2.17	39	40
11	Tamalate	182,939	43,788	174	3.97	52	55
12	Ujung Pandang	26,477	5,791	20	3.44	7	10
13	Ujung Tanah	46,836	9,673	40	4.12	12	12
14	Wajo	27,556	6,121	23	3.76	7	10
	Total	1,408,072	320,655	2,105	6.58	384	412

Source: Makassar Facts and Figure 2014 (MSO, 2014)

http://makassarkota.bps.go.id/?hal=publikasi_detil&id=37 and Permana et al (2015). Note: *Level of SWM practice was measured as the number of Household (HH), which are actively practiced SSWM, per 1000 of population in the respective districts.

The perceptions on the cleanliness of the surroundings as perceived by the respondents were acquired by employing an easily understood question: How do you feel about the cleanliness of your locality. The responses were given on a 5 point scale as follows: (1) I feel the surrounding are very dirty and messy (2) I feel dirty in the surroundings (3) I feel neither clean nor dirty in the locality (4) It is clean in the surroundings (5) I feel very clean in the surroundings. The level of sustainable solid waste management practices was measured by the proportion of households that actively practiced SSWM (SSWM Households) per 1000 population. The assumption of this measure was that SSWM households were enthusiastically practicing and actively promoting sustainable solid waste management in their locality. Their opinions about solid waste management done by waste management authorities and solid waste management activists were acquired separately.

RESULT AND DISCUSSIONS

RW as base point of sustainable SWM

Makassar City consists of 14 sub districts. The 14 sub districts are exhaustively divided into 143 wards, and with similar way, the 143 wards compose of 971 *Rukun Warga (RW)*. In total there are 320,655 households (refer to Table 2). As the base point of sustainable solid waste management, the activities consist of community-based SWM activities. In

case of Makassar City, the activities are mostly waste separation, 3Rs, composting and waste bank. The small scale solid waste management is commonly found. This is because of minimum supports received from the solid waste management authorities.

The waste separation, waste recyclable selling and waste recyclable banking are three most ubiquitous activities undertaken by the community members, because of several reasons such as (1) strong connections among the three activities (2) creating additional income to all (3) showing the role models that would encourage other community members to actively involved (4) reflecting the commitment of the active community members.

The regular activities of the community members those active in implementing household level sustainable solid waste management and the overall flow of the domestic waste (households as waste generators) in Makassar City can be schematically outlined in Diagram 1.

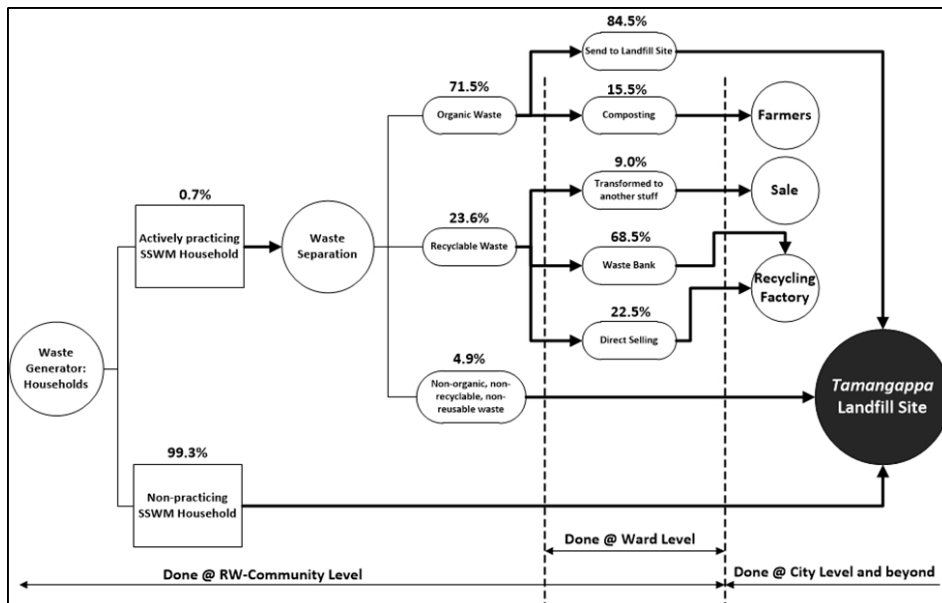


Diagram 1: Domestic Waste Flow in Makassar City

Diagram 1 shows that, in general, the flow of domestic waste is predominantly towards landfill site. The active household in implementing sustainable SWM counts only 0.7%. It is certainly quite insignificant towards overall performance of the City of Makassar in sustainable SWM. As a result, the Tamangappa Landfill site, the only disposal site is presently in operation in Makassar City, will soon be needed to replace. The NIMBY, on the other hand, is also strong within the urban citizens, and also in Makassar. Thus, the waste authority will seemingly face the social problems soon when the only landfill site available needs replacement.

The sustainable SWM activities at RW level consists of waste separation and first stage of 3Rs activities. Beyond that level, the active household must undertake their activities at wards or city level. Recycling factories are commonly operated beyond city

level, or even exporting the recycled materials to other countries. However, the RW-based sustainable SWM is the basis of overall SWM in Makassar City. The failure and success of the sustainable solid waste management would depend on the performance of them. It is therefore need very strong supports from solid waste stakeholders in order to be able to perform well.

Community Waste Banks

Figure 1 reflects that the predominant waste in Makassar is organic waste, which is accounted for 71.5%, while the other 23.6% is recyclable waste. The active households are thus depending on this amount of waste. While only about fifteen percent of the organic waste is composted domestically through household-based Takakura composting basket, the most of waste is disposed to landfill site.

From 23.6% recyclable waste, about 9% is transformed into another usable stuff such as handy-craft, the remaining 91% is for direct sale to the recycling factory or deposited to Waste Bank, and then waste bank sells it to recycling factory. There are presently 105 waste bank who have registered in 105 RW. Among these 105 waste banks, the largest and very active waste bank is Waste Bank *Pelita Harapan* in Rappocini sub district at RM IV Ballaparang Ward (Figure 2). This Waste Bank has presently 202 active household customers that do waste separation at household and sell the recyclables to this Bank.



Figure 2: Pelita Harapan Waste Bank

The first author of this paper has become registered members #201 since 27 April 2015. The majority of Bank's members of this waste bank live within RW IV Ballaparang Ward. Some other members are from other Wards. The Chairman of the Waste Bank is the Leader of RW IV. About 90% of the Waste Bank Officers are housewives who work voluntarily; they are unpaid workers (Figure 3). Bookkeeping management recorded

neatly by an Administrative Officer. Receiving and weighing the waste ends up at 5 pm every Sunday. Bank operating costs derived from the sale of wastes.



Figure 3: Waste Bank Businesses

All the 105 waste banks are presently active (Table 3), although their activities and performances are at different level. All the banks serve for the community and by the community with RW organization as the basis of their operation. All the officers work voluntarily without payment. The officers are usually people with high commitment on their community and or people with somewhat higher-than-average income. These waste banks are headed by RW Community Leader. The municipal waste authorities do not provide any financial support rather some technical supports such as training on solid waste management for the waste bank officers and champions within the communities.

Table 3: RW-based Waste Bank Organizations in Makassar city

NO	Waste Bank			Reg. Number
	RW	Wards	Name of Waste Bank	
1	4	Ballaparang	Pelita Harapan	MKS-01
2	2	Kalukuang	Restu Bumi	MKS-02
3	2	Tamamaung	Mandiri	MKS-03
4	1	Ujung Pandang Baru	Sehati	MKS-04
5	5	Pabaengbaeng	Pabaeng-Baeng 5	MKS-05
6	8	Bangkala	Mekar Swadaya	MKS-06
7	4	Cambaya	Pasang Surut	MKS-07
8	3	Karanganyar	Sipakatau	MKS-08
9	2	Lalatang	Lalatang	MKS-09
10	6	Bongaya	Asoka 6	MKS-10
11	5	Panaikang	Panaikang	MKS-11

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12	4	Bongaya	Asoka 4	MKS-12
13	4	Pannampu	Tunas Harapan	MKS-13
14	5	Kassi-Kassi	Durian	MKS-14
15	1	Tamalanrea Jaya	Bung	MKS-15
16	1	Suwangga	Cahaya Suangga	MKS-16
17	5	Layang	Layang Sehati	MKS-17
18	5	Kunjung Mae	Keraku Marga 04	MKS-18
19	5	Rappokalling	Mutiara	MKS-19
20	5	Jongaya	Kumala	MKS-20
21	3	Karuwisi Utara	Adipura	MKS-21
22	1	Ballaparang	Pelita Bangsa	MKS-22
23	5	Sudiang	Cumullus	MKS-23
24	1	Lalatang	Star	MKS-24
25	4	Bara-Baraya Selatan	Sukses Mulia	MKS-25
26	10	Mappala	Bersatu	MKS-26
27	11	Tello Baru	Tello Ceria	MKS-27
28	5	Tanjung Mardeka	Tanjung Bayang	MKS-28
29	2	Maradekaya	Maradekaya	MKS-29
30	3	Maricaya Baru	Maribar 03	MKS-30
31	5	Bara-Baraya	Asbar Ceria	MKS-31
32	9	Bongaya	Titian Sejahtera	MKS-32
33	8	Pabaengbaeng	Bersatu	MKS-33
34	11	Barombong	Berdikari	MKS-34
35	11	Sudiang Raya	Sudira	MKS-35
36	2	Bira	Bira 2	MKS-36
37	3	Tamalanrea Jaya	Tunas Mekar	MKS-37
38	2	Ballaparang	Dahlia 2	MKS-38
39	5	Bontomakkio	Bersatu	MKS-39
40	3	Gaddong	Mandiri	MKS-40
41	3	Bara-Baraya Timur	Bartim	MKS-41
42	4	Suwangga	Suwangga 4	MKS-42
43	3	Camba Berua	Tawakkal	MKS-43
44	4	Pattinjalloang	Pattinjalloang 4	MKS-44
45	1	Mappala	Mappala 1	MKS-45
46	13	Gunung Sari	Minasa Upa	MKS-46
47	4	Karungrung	Jipang 04	MKS-47
48	1	Maradekaya	Maradekaya 1	MKS-48
49	2	Tamalabba	Bersinar	MKS-49
50	5	Untia	Cahaya Bahari	MKS-50
51	1	Mampu	Mampu 1	MKS-51
52	2	Bonto Lebang	Bonto Lebang	MKS-52
53	1	Barrang Lompo	Samaturu	MKS-53
54	1	Rappokalling	Sipakainga	MKS-54
55	1	Karuwisi	Citra Abadi	MKS-55
56	7	Ballaparang	Glatik	MKS-56
57	1	Tallo	Rakyat Tallo	MKS-57
58	9	Ballaparang	Gotong Royong	MKS-58
59	8	Batua	Bampasker	MKS-59
60	1	Tamalabba	Hoki 1	MKS-60
61	2	Rappokalling	Berlian	MKS-61
62	3	Rappokalling	Permata Bunda	MKS-62
63	5	Kaluku Bodoa	Permata	MKS-63
64	5	Rappocini	Monginsidi	MKS-64
65	5	Buakana	Harapan	MKS-65
66	10	Barombong	Danau Biru	MKS-66

67	3	Maccini Sombala	Je'neberang	MKS-67
68	9	Mappala	Bunga Tonjong	MKS-68
69	4	Tallo	Marbo Bahari	MKS-69
70	2	Lae-Lae	Intang	MKS-70
71	2	Tallo	Lestari	MKS-71
72	3	Barana	Melati	MKS-72
73	4	Tamalanrea	Cokro Indah	MKS-73
74	13	Tamalanrea	Berlian	MKS-74
75	9	Bulurokeng	Mutiara Asri	MKS-75
76	9	Sudiang Raya	Rahmat	MKS-76
77	14	Bulurokeng	Indah Berseri	MKS-77
78	12	Bulurokeng	Mutiara Jelita	MKS-78
79	4	Camba Berua	Camber 4	MKS-79
80	1	Sudiang Raya	Gelora	MKS-80
81	2	Ende	Rezki	MKS-81
82	1	Lembo	Sipurennu	MKS-82
83	21	Sudiang Raya	Citra Daya	MKS-83
84	10	Parang Tambung	Peduli Lingkungan	MKS-84
85	4	Rappokalling	Bersinar	MKS-85
86	5	Bongaya	Surya Abadi	MKS-86
87	18	Sudiang Raya	Berkah	MKS-87
88	5	Tallo	Rajata	MKS-88
89	5	Tamamaung	Matahari	MKS-89
90	7	Batua	Batua	MKS-90
91	3	Maradekaya	Maradekaya	MKS-91
92	3	Tallo	Rempong	MKS-92
93	5	Lette	Peduli	MKS-93
94	1	Mariso	Nuri Indah	MKS-94
95	1	Tamalanrea Indah	Tamalanrea Indah	MKS-95
96	6	Paccerakkang	Indah	MKS-96
97	3	Paccerakkang	Sakinah	MKS-97
98	5	Lembo	Sikatutui	MKS-98
99	2	Lembo	Sipakalebbiri	MKS-99
100	1	Maricaya Selatan	Kenanga	MKS-100
101	5	Tamamaung	Matahari	MKS-101
102	1	Rappocini	Agang Ta'	MKS-102
103	3	Pisang Selatan	Pissel	MKS-103
104	1	Bontoala	Cempaka	MKS-104
105	1	Karunrung	Karya 2	MKS-105

The financial income received by the members of Waste Banks has helped increasing their household disposable income. This can be seen on the total amount disbursed of about USD 36,000 to the members of garbage bank (Yayasan Peduli Negeri -YPN, 2013). The benefits for public waste bank were able to increase the income of the people because when they exchange their garbage will receive remuneration in the form of money collected in the accounts they have. Society may, at any time, take the money at the time savings already collected a lot of savings. Rewards given to depositors not only in the form of money, but some are in the form of basic foodstuffs such as sugar, soap, oil and rice. Bank of garbage is also beneficial for students who are disadvantaged in terms of financial; some schools have implemented tuition payments using the garbage.

Until now, the average monthly waste collection is 30 kilograms up to two tons of recyclable waste per month per unit of waste banks, with a turnover of hundreds of

thousands dollars per month This proves that the bank system does not only reduce the amount of garbage bins, but also be a solution for the welfare of society as well as it can increase revenue and improve the local economy. Makassar city itself has been able to reduce waste as much as 281 tons of organic waste in 2000. The existence of Garbage Bank has a positive impact in the community, only the pilot project has not been widely followed by other RW. While the relevant agencies and industry, yet in synergy with the Waste Bank practice in the field, giving the impression of each walk alone whereas the issue of waste must be ganged together with synergy with one another.

By the activities of waste bank, the local government of Makassar City has included the waste bank program in Makassar Clean and Green City. The Makassar Clean and Green City has also involved the private sector, particularly industries those generate waste through their own Corporate Social Responsibility (CSR) Program. Makassar efforts in making Waste Bank Program as one of the priority program of Makassar Green and Clean has received positive feedback from various parties. One of them is Unilever Company as a partner Makassar Clean and Green since 2008. Unilever Indonesia Foundation (YUI) as its corporate social responsibility activity participates in tackling social and environmental issues in the Makassar Clean and Green Program.

Some companies whose activities have an impact on the environment have started establishing CSR activities that care for the environment and voluntarily disclose their CSR performance in a variety of ways, either through a special and separate program, as well as being part of the annual program. Another important thing, so that people can feel the most out of CSR activities of the company is maintained environmental sustainability of the CSR activities. Four alternative areas of environmental CSR activities include: (1) Waste Management through the process of Reduce, Reuse and Recycle (3R); (2) Some existing CSR activities carried out only for a moment and unsustainable so that targets are not met; (3) Tree planting activities (4) Funding schemes. The Rukun Warga approach in waste reduction especially in the urban center has been able to contribute to the reduction of waste disposal to landfill site in Makassar. Its significance can be seen in the reduction of total volume of solid waste by 12% (dry waste) and 17% of organic waste (wet waste) in 2013 disposed to landfill site.

Community Waste Composting

Nowadays, city government attempts to help citizens in doing composting at household level by providing Takakura's magic basket to selected households. Takakura's magic basket is a basket that 'magically' transfers waste into compost. This is also called Takakura Home Method, named after Mr. Koji Takakura, a researcher of Wakamatsu Environmental Research Institute, Japan (ECO-CSR, 2015). Households who practice waste composting usually put their organic wastes into a basket called Takakura's magic basket to turn into compost in a natural process. If this movement can be done at city level, a significant quantity of organic waste can be diverted from the disposal site to more useful waste.

Realizing the large quantity of organic waste, some large cities in Indonesia have already been making efforts to reduce waste by trying to adopt feasible composting technology as part of waste reduction. However, some composting ventures have collapsed due to the absence of market for its finished products and not meeting the requirement of the market aside from its high price (Damanhuri and Padmi, 2000). Market

is the most problem in composting in almost all developing countries. The final product of composting is agricultural fertilizer, while there are presently chemical fertilizers in the market which the price is probably lower than composting product fertilizer. In addition, the farmers have been customary to use chemical fertilizer products and some reports show that the productivity of plants that use chemical fertilizer is higher than that of use composting fertilizer. By this condition, the composting fertilizer is difficult to compete with chemical fertilizer amid biodegradability and contribution to waste reduction of composting fertilizer. This is why the progress of waste composting is almost standing still.

We can see themselves in the environment around the city, the unavailability of landfills. In this case the government should provide adequate landfills for each region in order to avoid the name of littering that can cause environmental pollution. It is known that in urban areas the buildings so close together to landfills is very limited which makes people throw garbage city is not in place although it contains the warning signs prohibiting to dispose of waste on the site. Constitution no. 23, 1997 Article 6, paragraph 1, which reads: "Every person is obliged to preserve the function of the environment as well as prevent and control pollution and environmental destruction". To achieve the condition of the people who live healthy and prosperous in the future, it will be necessary for a healthy living environment. From the aspect of waste, then the word will mean healthy as conditions that would be achieved if the waste can be managed well so clean from neighborhoods where human activity in it (Minister of Public Works Regulation 21/PRT/M/2006).

Perceived Cleanliness in the Locality

Cleanliness is a state free of impurities, including, dust, garbage and odors. (www.wikipedia.com). Cleanliness can also be regarded as a sterile state, free from dirt and reflect the holiness and purity. According to Mustafa, a community leader, and the environment are all external factors, physical, and biological directly adhered to the survival, growth, and reproductive development of organisms. Furthermore, the environment is a natural state of human society interacts.

We acquired the perception on cleanliness of the surroundings from the selected residents in the wards, in connection with the solid waste management activities in the community. The cleanliness as perceived by the residents was acquired by asking them a plain and easily understood question: How do you feel about the cleanliness of your locality. The responses were given on a 5 point scale as follows: (1) I feel the surrounding are very dirty and messy (2) I feel dirty in the surroundings (3) I feel neither clean nor dirty in the locality (4) It is clean in the surroundings (5) I feel very clean in the surroundings.



Figure 4: A Sample of Clean Environment as perceived by Respondents

By this question, the responses are summarized in Table 4. It is can easily be seen that when the level of sustainable SWM activities in the community is high, the surrounding is perceived clean by the community.

Table 4: Perceived Cleanliness and Level of Sustainable SWM

Township	Item	Perceived Cleanliness (1=Dirty, 5=Cleanest)					Level of SSWM*
		1	2	3	4	5	
Biringkanaya	Count	9	34	11	0	0	2.50
	%	16.7%	63.0%	20.4%	0.0%	0.0%	
Bontoala	Count	3	6	8	0	0	4.38
	%	17.6%	35.3%	47.1%	0.0%	0.0%	
Makassar	Count	2	3	14	2	0	6.15
	%	9.5%	14.3%	66.7%	9.5%	0.0%	
Mamajang	Count	2	3	7	4	0	6.73
	%	12.5%	18.8%	43.8%	25.0%	0.0%	
Manggala	Count	2	4	20	11	0	4.04
	%	5.4%	10.8%	54.1%	29.7%	0.0%	
Mariso	Count	1	4	8	5	0	5.30
	%	5.6%	22.2%	44.4%	27.8%	0.0%	
Panakukang	Count	1	2	9	28	2	9.77
	%	2.4%	4.8%	21.4%	66.7%	4.8%	
Rappocini	Count	0	0	8	26	11	11.06
	%	0.0%	0.0%	17.8%	57.8%	24.4%	
Tallo	Count	0	0	13	14	8	18.26
	%	0.0%	0.0%	37.1%	40.0%	22.9%	
Tamalanrea	Count	8	17	13	2	0	2.17
	%	20.0%	42.5%	32.5%	5.0%	0.0%	
Tamalate	Count	0	12	32	11	0	3.97
	%	0.0%	21.8%	58.2%	20.0%	0.0%	

Ujungpandang	Count	0	5	5	0	0	3.45
	%	0.0%	50.0%	50.0%	0.0%	0.0%	
Ujungtanah	Count	0	5	6	1	0	4.14
	%	0.0%	41.7%	50.0%	8.3%	0.0%	
Wajo	Count	0	3	7	0	0	3.76
	%	0.0%	30.0%	70.0%	0.0%	0.0%	
TOTAL	Count	28	98	161	104	21	
	%	6.8%	23.8%	39.1%	25.2%	5.1%	

Table 4 shows that Panakukang, Rappocini and Tallo are three sub-districts that are perceived the cleanest by the local respondents, as majority of the respondents perceived clean and very clean (Scale 4 to 5). The Table also shows that higher percentage of the citizens in these three sub-districts who are engaging in the sustainable SWM activities. On the other hand, Tamalanrea, Biringkanaya, Bontoala, Mamajang and Makassar are the dirtiest sub-districts in Makassar City. In these districts, the level of engagement of the residents in the sustainable SWM activities is lower than the top-three sub-districts. By this finding, it is confirmed that the level of sustainable SWM activities is strongly associated with the perceived cleanliness. This finding also tells us that there should be more citizens engaging in sustainable solid waste management activities to accomplish the highly perceived environmental cleanliness. This is depending on the existing and future policies of the central and local government and willingness of these two level of government, and most importantly is the awareness of citizens.

CONCLUSIONS AND THE WAY FORWARD

There are actually sufficient set of Acts and Government Regulations associated with solid waste management in place at the national level. For example, Act 18/2008 regarding Solid Waste Management (UURI: 18/2008), Government Regulation 81/2012 on Municipal Solid Waste (PP: 81/2012), Minister of Environment's Regulation 13/2012 on 3Rs and Makassar City Regulation 4/2011 on Waste Separation at Household Level have been enacted. The weakness point lies on the implementation side, particularly on the capacity of the authority.

The institutional setting at community level for the up-scaling sustainable SWM in the whole city is in place. RW can be used as the basic point of the institutional setting at community level. The embryos are existing, the remaining work is to strengthen these embryos towards certain level of strength to sustain.

What the local government need to do are (1) strengthening the community-based institutional setting by reinforcing RW organization in handling sustainable solid waste management at community level (2) upscaling the present RW-based sustainable SWM to city level by duplicating the existing RW-based activities to other RWs, (3) allocating and providing an financial incentives and supports for the SSWM households.

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LIVEABILITY PLANNING FOR CITIES: WITHIN THE ISLAMIC FRAMEWORK OF MAQASID AL-SHARI'AH

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Abstract

Liveability Planning is a new dimension of town planning practice. Town planning in Malaysia has been very physical and policy-biased. The soul component of liveability, quality of life and sustainability has been lacking. That is why environmental problems have now become the order of the day making urban living unhappy. Indeed liveability, quality of life and sustainability is one continuous process; a continuum. Conventional liveable indicators seem to concentrate more on economic and social wellbeing and lack religious elements. This gap is thought to be the missing link disabling human beings to live in harmony with nature. This research engages in the combined methodology which involves Focus Group Discussions, Interviews and Perception surveys in the formulation of the liveable city planning methodology based on Maqasid Al-Shari'ah (objectives of the Islamic Laws). Liveability planning practice that incorporate Maqasid into the conventional liveability indicators will render cities more liveable in the future.

Keyword: Liveability planning; Liveable indicators; Liveable city; Maqasid Al-Shari'ah.

INTRODUCTION

Critiques have it that the Malaysian town planning practice and the preparation of plans has been mundanely physical and policy-statements biased. This started since 1967 when the Town and Country Planning Act, Act 172 (Government of Malaysia 1976), was first enacted and adopted. Hence the National Physical Plan (National Physical Plan 2010), the Structure Plans, the Local Plans and the Special Area Plans when implemented were found full of loopholes and misinterpretations and in some cases blatantly maneuvered by developers for their maximization of profit pursuits. The brunt of this practice unfortunately has been backlashed by numerous environmental disasters and issues. Landslides, floods, air pollution, water woes, high mean temperatures and droughts have become rampant since the last two decades especially when urbanization and the economic development became the main agendas of the country.

Local governments on the other hand have been saddled with the task to create liveable cities, to offer quality of life and to fulfill sustainability objectives. Likewise, pressures of development in urban areas to cater for its inhabitant needs also form challenges especially to the town planners. Local Plans and Special Area Plans should therefore be cleverly customised for its residents' present as well as future needs.

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Consciously or unconsciously Town planners aspire to create liveable cities. Liveable cities offer certain living standards and quality of life. This state of affairs when they have become the everyday norm of city living would of course be wished to be sustained and to be continuously enjoyed and be consistently improved. This is where Liveability Planning would take centre stage and play its role. Liveability and sustainability are two interrelated planning goals that have become the main agenda of sustainable development which had since been encompassed in the Brundtland Report (Burton 1987).

Liveability Planning

Liveability Planning is the result of the culmination of both the land use planning system which promotes the role of planning in creating liveable and sustainable cities and at the same time enhancing the wellbeing and quality of life of urban communities. As opposed to Physical Planning, elements of the People ware or Heart ware which is the core business of *Maqasid Al-Shari'ah* are to be integrated into the process of town planning and manifested into the lives of the peoples. Islamisation of town planning practice need to be inculcated towards ensuring liveability, quality of life, happiness and sustainability - all in one package. In fact it constitute as a continuum process. Indeed these are interrelated and influence each other towards quality living within the ambit of the environment, in this world and in the hereafter. Physical planning alone would not be able to deliver a complete urban living package and exude real happiness for the urban population. It has to be supported by the human factor itself; his purpose of life and his way of life as entrusted upon him by his creator. *Maqasid al-Shari'ah* or the objectives of Islamic Law has been provided by Allah as the 'manual' for man to lead his life on earth; in its destined manner.

Conventionally, Town Planning provides physical layouts for liveable neighbourhoods and provisions of high standards of urban services and social facilities that guarantee quality of life. It is then related directly to the quantity surveyors' Life Cycle Costing (LCC) that begins first by creating happiness which then attracts investors and subsequently promotes sustainable developments. It is able to create certain built environment, urbanscapes and city image. This is where the interconnectedness of town planning and architecture lie. However, present shortcomings of planning have arguably been too physical and too policy-biased which are not easily translated into quality, life cycle costing and happiness of peoples. Meanwhile, *Maqasid Al-Shari'ah* seems to stand-alone and have not been integrated with worldly concerns like town planning, quantity surveying and architecture in creating the built environment.

It is the contention of this study that Liveability planning could bridge this gap. Liveability aspects need to be interwoven with the other components of the built environment for the benefit of not only the "*ummah*" but for the universal human beings. This gap will have to be proven in this empirical research which involves case studies of two prominent towns of Malaysia i.e. Putrajaya and Shah Alam. Examinations on whether liveability planning has been consciously integrated with the *Maqasid Al-Shari'ah* and evaluation on whether the spiritual or religious wellbeing of the people have been emphasized or are lacking will be conducted.

The research will highlight the weaknesses occurring especially in the vagueness of current planning policies and plan statements, the meaning and the concept of liveability in the *Maqasid Al-Shari'ah* context with its three levels of importance to

human lives i.e. *Dharuriyyat*(the essentials), *Hajiyyat*(the complementaries) and *Tahsiniyyat*(the desirables or the embellishments). Most importantly the surficial or minimal considerations of these values in the process of planning and its implementation will be highlighted. Thus, to overcome this shortcoming, liveability planning which integrate the conventional indicators and the *Maqasid Al-Shari'ah* indicators are strongly advocated.

Maqasid Al-Shari'ah

For the past two decades, liveable cities indicators have been dominated by Western methodologies of measurement. For comparison sake, this may be termed as the Conventional liveability Indicators or Indices as represented by the three renowned organizations i.e. Monocle, Mercer and EIU (STEEP 2013). Meanwhile numerous studies on *Maqasid Al-Shari'ah* too had been undertaken especially by Islamic Jurists and scholars since The Caliph Umar's reign until more recent debates by contemporary scholars like Auda (2008), Kamali and Kamali (2008) and Al and Chik (2011). These focus on benefits or objectives of Islamic Law that have to be abided by to take care of human intrinsic needs in life. However, upon examination of both disciplines; the conventional and the *Maqasid Al-Shari'ah*, it seems that they are not integrated to each other and had not been jointly highlighted to benefit human beings in a comprehensive manner.

This study therefore attempts to fill up this gap where the Islamic liveable cities indicators via *Maqasid Al-Shari'ah*, will be merged and incorporated into those conventional measurements to render the whole exercise more comprehensive, broad and dynamic for the ultimate benefits to all mankind. Together, the conventional methodology and the *Maqasid Al-Shari'ah* approach may effectively contribute to the possible solution of contemporary humanity problems. Contemporary Islamic scholars refer this form of civilizational renewal as *Al-tajdid al-hadari* or the agenda of civilizational renewal (Bakar 2015). *Maqasid Al-Shari'ah* comprises benefits, welfare and advantages behind the revelation of Islamic Laws for human beings and warding off evil, injury and loss. These are sometimes referred to as *Masalih Al-Ibad* in Arabic. *Maqasid Al-Shari'ah* is concerned about the protection of life, faith, intellect; lineage and property for human beings. These are seen as absolute requirements for the survival and spiritual well-being of individuals and the public, without which it would lead to destruction, collapse, chaos and demise of the normal order of societies (Bakar 2015).

The *Maqasid-cum-Masalih* has been broken down into three levels of importance i.e. the *Dharuriyyat*, the *Hajiyyat* and the *Tahsiniyyat*. This theoretical framework of *Maqasid Al-Shari'ah* alias the “*panca*” (five) goals can be traced back to the administration of the second caliph, Umar bin al-Khattab (d. 644) and the Maliki School of Islamic jurisprudence, which emphasized public interest or *Maslahah*. In fact, the concept of *Maqasid* was first developed by the twelfth century theologian Abu Hamid al-Ghazali Abu Hamid al-Ghazali (d. 1111) who had pioneered the categorization of *Maqasid Al-Shari'ah* into the three descending categories of significance mentioned earlier.

Dharuriyyat (Essentials/ Necessities) are seen as absolute requirements for the survival and the spiritual well-being of individuals and communities. These objectives are musts and basic for the establishment of the general human welfare of this world and

the world hereafter. If they are ignored then the coherence and order cannot be established and chaos, disorder and loss will prevail.

Dharuriyyat relates to five things for human wellbeing and development (Kamali and Kamali 2008) as follows:

- 1) Protection of Faith/Belief (*Din*)
- 2) Protection of Life (*Nafs*)
- 3) Protection of Reason/Intellect (*'Aql*)
- 4) Protection of Posterity/Lineage (*Nasl*)
- 5) Protection of Property/Wealth. (*Maal*)

For example, in murder and burglary cases, the punishment is by *Hudud laws*, and for adultery cases, the punitive punishment is public throwing of stones till death. The severe punishment according to *Shari'ah* law must be executed in order to discipline mankind for long term benefits. *Solah*, *zakah*, fasting and hajj are compulsory for the maintenance of faith (*din*). Building mosque, *Baitul Mal*, clothing, housing, is meant to maintain life (*Nafs*). The safeguarding of *'Aql*, *Nasl* and *Maal* are necessary to fulfill the objective of basic needs and essentials of a human life of the *Dharuriyyat* category.

The second category of benefits, the *Hajiyyat* or the complimentary benefits, seek to protect and promote the essential *masalih* on a secondary capacity. All such provisions of *Shari'ah* which aim at facilitating life and removing hardship are said to fulfill the *Hajiyyat* (requirements). Often those needs apply to individuals; for example during *Ramadhan* one may break fast when travelling or a Muslim lady may take off her *hijab* when being treated by a male doctor. Hence these waivers remove severity and hardship in cases where they do not pose threats to human survival (Sarkawi et al. 2008, Winkel 2011). Other examples of *Hajiyyat* include permission of hunting and use of halal goods for food, lodging, and conveyance, the permission for *qirad* (profit sharing through borrowing), *musaqah* (profit sharing) and *bai salam* (forward buying of a commodity which does not yet exist). *Hajiyyat ruksah* (concessions), such as the shortening of the *Salah* (prayer) during long distance travel and in battlefield, the forgoing of the fast by the sick, the traveller and masons or building workers are some more examples of *Shari'ah* provisions that aim at facilitating and removing hardships in life. Likewise in the criminal law, should there be doubts in reaching verdicts, penalties could be suspended. The general rule is that when there is a plurality of conflicting *masalih* and none appears to be clearly preferable, then the prevention of evil takes priority over the realisation of benefit. This is stressed by the Prophet's (Pbuh) hadith - "*When I order you to do something, do it to the extent of your ability, but when I forbid you from something, then avoid it altogether*".

The last category of benefits i.e. Desirables/Luxuries (*Tahsiniyyat*) involves good human being practices and mannerisms; for example a Muslim lady is to decorate or groom herself for the enjoyment of her husband, all Muslims should conduct table manners when eating and not to indulge in business involving "haram" products. Kamali and Kamali (2008) summarized this as seeking to attain refinement and perfection in customs and conduct of the people at all levels.

Shari'ah beautifies life and puts comforts into it. In fact, there are several provisions of the *Shari'ah* which are meant to ensure better utilization, beautification and simplification of the *Dharuriyyat* and the *Hajiyyat* in the form of the *Tahsiniyyat*. For

example, permission to use beautiful, comfortable things; to eat delicious food, cleanliness of the body and attire for the purposes of 'ibadah, the use of perfume when attending Friday congregational prayer seek to attain refinement, comfort and perfection in the customs and conduct of people. The *Shari'ah* also encourages the giving of charity to those in need (*sadaqah and waqaf*) in the spirit of *Tahsiniyyat*.

Liveable Cities

The so-called World liveable cities indices by Monocles, EIU and Mercer even though covered a wide range of social, physical, economic, environmental and political aspects are not standardized (As illustrated by Table 1). Certain sectors take prominence than the other and within each sector various sub-components are examined and measured. Hence this resulted in different cities crowned as most liveable cities. Table 2 shows the 2014 top ten rankings of world liveable cities which obviously differ altogether but predominantly European-biased. Only Monocle recognized three Japanese cities as liveable though.

Table 1: Criteria used in the liveable cities index

World Organization.	EIU ¹ (5 Categories)	MERCER ² (10 categories)	MONOCLE ³ (12 categories)
Criteria	1) 25 % Stability Prevalence of crime, threat of military conflict, civil unrest & terrorism	1) Political & Social environment	1) Safety, Crime 2) Tolerance
	2) 20 % Healthcare Availability & quality of public and private health care	2) Medical & Health considerations	3) Medical care
	3) 25 % Culture & Environment Climate, corruption, social/ religious restrictions, recreation: sports, culture, food and drink, availability of consumer goods and services	3) Socio- Cultural environment 4) Natural environment 5) Recreation 6) Consumer goods 7) Public Services	4) Climate & sunshine 5) Quality of architecture 6) Environmental issues 7) Access to nature 8) Urban design
	4) 10 % Education Availability & quality of public & private education	8) Schools & Education	
	5) 20 % Infrastructure International Transportation modes & quality of public transportation, availability & quality of	9) Housing 10) Economic environment	9) International connectivity 10) Public Transportation 11) Pro-active Policy developments 12) Business condition

housing, utilities,
 amenities,
 communications and
 infrastructure

Table 2: Top ten rankings of world's liveable cities

Rank	Monocle (2014)		EIU (2014)		Mercer (2014)	
	City	Country	City	Country	City	Country
1	Copenhagen	Denmark	Melbourne	Australia	Vienna	Austria
2	Tokyo	Japan	Vienna	Austria	Zurich	Switzerland
3	Melbourne	Australia	Vancouver	Canada	Auckland	New Zealand
4	Stockholm	Sweden	Toronto	Canada	Munich	Germany
5	Helsinki	Finland	Adelaide	Australia	Vancouver	Canada
6	Vienna	Austria	Calgary	Canada	Dusseldorf	Germany
7	Zurich	Switzerland	Sydney	Australia	Frankfurt	Germany
8	Munich	Germany	Helsinki	Finland	Geneva	Switzerland
9	Kyoto	Japan	Perth	Australia	Copenhagen	Denmark
10	Fukuoka	Japan	Auckland	New Zealand	Bern	Switzerland

Table 3: The Asia's top liveable cities, 2014

Cities	EIU (203 cities)	MERCER (460 cities)	ECA (400 locations)	Asia Rank/Top liveable Asian Cities
Singapore	53	28	1	1. Singapore
Kuala Lumpur	78	74	62	2. Kobe
Bangkok	101	118	62	3. Hong Kong
Bandar Seri Begawan	100	97	94	4. Tokyo
Manila	107	128	142	5. Yokohama
Jakarta	125	141	191	6. Taipei
Hanoi	123	151	123	7. Macau
Ho Chi Minh City	150	126	120	8. Georgetown
Phnom Penh	130	190	171	9. Seoul
				10. Kuala Lumpur

Meanwhile, for Asian cities (Table 3), Monocle and Mercer rated them not liveable, even Singapore falls in 28th place by Mercer while EIU put Singapore at 53rd place. However, another organisation (ECA) acknowledged Singapore as the most liveable city in the world.

Liveability and Urbanization - The Malaysian case

Liveability and urbanization became a concern when people began to migrate from the rural areas to the urban centres since the Second Malaysian Plan period (1971-1975) (Alatas 1972). This was in line with the government's two prong strategy to eradicate poverty and to eliminate identification of race by their economic activities. Urbanization rate grew at a very fast pace and the urban population increased tremendously. It is projected that (The National Physical Plan 2010) more than 75% of the overall Malaysian population will live in towns and cities by the year 2020. As at the last population census, in 2010, total population stood at 28,334,135 people and the urbanization rate was 2.4%. As of 1st January 2015, the population of Malaysia was estimated to be 30,644,293 people (Government of Malaysia 2015) and rate of urbanization: 2.49% annual rate of change (2010-15 est.). It is therefore anticipated that the rapidly urbanizing trend will inflict increasing pressures on the urban services, health services, the housing and the economic sector and eventually the environment and natural resource reserves.

Meanwhile the lifestyles of the urban population worsen the health of the environment itself. Air pollution caused by motor vehicles is one source that are being generated by the urban population. The Malaysian Automobile Association (MAA) Statistics on total registered vehicles in Malaysia in 2000 was 343,173 units and in 2013 had increased double fold at 655,793 units. This shows that Malaysian car ownership per capita is high because for every 1000 Malaysians, 273 Malaysians own vehicles. Hence the culprit of the air pollution in Malaysian towns.

Other Urbanization issues that proof Malaysian towns are not so liveable include the water supply woes, traffic jams, air pollution index (API) more than 300 API incidences, flooding such as flash floods and monsoon floods, poor quality of life for example living in poor housing or slums, health problems, safety or high crime rates in housing neighbourhoods and everywhere, snatch thefts, etc.

The continuing increase of the rate of urbanization since the 70s until now requires the need for more systematic liveability planning, efficient administration and better delivery of services at the local authorities' level.

Future of cities – Liveability, quality of life and sustainability package

Generally, the future of cities is closely related to matters below:

- i. A 'liveable future' is one that is enduring, vibrant, responsible (civil), and offers a desirable quality of life which need a balance of three key societal goals: vibrant communities, vital economy, and sustainable environment.
- ii. Liveability and sustainability should be the guiding principle for planning and policy making. Concepts of Liveability, quality of life and sustainability as a package and a continuum should be emphasized in planning and implementation.

- iii. Cities function as engines of growth. When cities grow the entire nation grows. Liveability shapes public perception and infrastructure investments in cities, as well as competition among cities for the attention of the public, investments, communities in future capitalistic economies.
- iv. That liveability and sustainability often overlap and influence each other.

Why is liveability important?

- i. Liveability is a measure of objective quality of life. People living in liveable cities are supposed to enjoy happy lives. It is important for people or its residents to be happy and make other people happy (Fowler and Christakis 2008). Meanwhile, according to the liveability theory, objective conditions such as infrastructure also make subjective wellbeing (Veenhoven and Ehrhardt 1995). These form basic requirements inevitable for urban living.
- ii. For economic vibrancy. Liveability is important for businesses – ‘happy people are better workers’ (Lyubomirsky et al. 2005).
- iii. For good governance. Liveability is important for city governments, because liveable cities attract good workers and businesses, and business activity is the key for city development (Economist 2011).

Liveability in the Context of *Maqasid Al-Shari'ah*

This exercise will attempt to develop a new model based on the *Maqasid Al-Shari'ah* fundamentals. It does not mean that the conventional indicators used so far are not “Islamic” and universal but to a certain extent they carried Islamic messages internally. These need to be consciously spelled out because it deals with the human factor itself which is universal and affect everybody; Muslims and Non-Muslims alike. So the Islamic components will be integrated into the conventional measurements to render it holistic, comprehensive and complete. Table 4 is the framework on which this new model will be based upon. In terms of priority, *Dharuriyyat* is the most important, second comes the *Hajiyyat* and lastly the *Tahsiniyyat*. However, notice that, in terms of weightage, all five elements of the *Maqasid Al-Shari'ah* are given equal weightage (20% each) unlike those given by the EIU in Table 1 earlier.

Table 4: The framework for the new model of liveability – the *Maqasid Al-Shari'ah* model

MAS according to hierarchy	<i>Dharuriyyat</i> (Necessities / Essentials)	<i>Hajiyyat</i> (Needs / Complimentary)	<i>Tahsiniyyat</i> (Luxuries / Desirables)
Din 20%			
Nafs 20%			
Aql 20%			
Nasl 20%			
Maal			

20%			
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Table 5 below shows the evaluation matrix of the five *Maqasid Al-Shari'ah* against the liveability Index of the world organizations which is represented by the three organizations; EIU, Mercer and Monocle while the MURNInet represent Malaysian sustainability Indicators. Focusing on the remarks column, it is found that in terms of preservation of life, the conventional liveability indicators show strong emphasis. Likewise for the intellect and property or wealth elements, the conventional indicators paid due attention to them. However, as far as *Din* and *Nasl* i.e. religion and lineage are concerned, they are either silent, minimally mentioned and did not mention at all.

Table 5: The Maqasid Al-Shari'ah matrix

The 5 Objectives	Liveability Index		Remarks
	World	MURNInets	
<i>Din</i> Preservation of Religion	Social network	Spirituality (under the Happiness Index)	- Not mention in the Liveability Index - Mention surfcially in Happiness Index
<i>Nafs</i> Preservation of Life	- Economic, social and political stability - Healthcare - Culture & environmental - Education - Transportation	- Economic efficiency - Opt, landuse - Social quality - Sustainable environmental quality - Efficient transportation & infrastructure - Effective governance	Complete considerations on all aspects of quality of human living in both the world and the Malaysian sustainability indicators
<i>'Aqal</i> Preservation of Intellect	Education: schools and universities	Social facilities	World index emphasized on world class universities
<i>Nasl</i> Preservation of Lineage	Nil	Relationship interaction with family	Not mention in the world Indicators
<i>Maal</i> Preservation of Poperty	Economic wellbeing, high salaries, economic stability	Competitive and efficient economic development	Being emphasized by the world liveable indicators

Understandably Western ideologies on life are all about progress, economic development and prosperity. Lineage which hinges on the sanctity of the marriage institution is very much distorted in the western and modern lives. People do not find it necessary to marry, they are free to have sex out of wed lock, free sex culture are rampant, homosexuality and lesbianism are commonly practiced and they do not favour to bear children. Relationships with parents and family ties have become very loose and the concept of filial piety has been eroded. These states of social affairs confronting the world today obviously show the non-compliance of human beings to the *Maqasid al-Shariah* hence the progression towards the doom of human civilization. Even western scholars acknowledged about this trend of the clash of civilizations of the future (Huntington 1996).

RESEARCH METHODOLOGY

To decide on the appropriate methodology, this study relates it with the Research Objectives and the Research questions. These are listed up as follows:-

Research objectives

- 1) To explore and evaluate current world liveability surveys that rank liveable cities which are based on their pre-determined sets of indicators and level of importance.
- 2) To study and highlight the Islamic human wellbeing indicators via the *Maqasid Al-Shari'ah* fundamentals.
- 3) To integrate the conventional world liveability indicators into the Islamic *Maqasid Al-Shari'ah* vice versa via developing an assessment tool or model.
- 4) To test and validate this model on Shah Alam and Putrajaya; as case studies.

Research questions

The research questions are interrelated to the research objectives as outlined above. They are:-

- 1) What are the strengths and weaknesses of the existing indicators used to determine and rank liveable cities?
- 2) Why are current liveability indicators inadequate and still cause liveability problems in the cities of the world? Can *Maqasid Al-Shari'ah* fill in the missing link?
- 3) How should *Maqasid Al-Shari'ah* be embedded or integrated into the conventional methodology of identifying liveable cities?
- 4) How can the developed model of assessing liveable cities once tested and validated be applied to all cities of the world for its liveability level?

This research will study on the effectiveness of town planning vis-à-vis the creation of liveability, happiness and quality of life for the people via efforts from the local authorities. This is measured through the Triangulation methodology by examining the planners' Islamic knowledge on *Maqasid Al-Shari'ah* against the local authority Councillors who execute the plan. A Content Analysis of the Putrajaya and Shah Alam Local Plans will be carried out to gauge the inclusion of the elements of *Maqasid Al-Shari'ah* in the plans. Interviewing experts in *Maqasid Al-Shari'ah* will enlighten the aspects that are missing in the plans that have been prepared and their implementation. The analysis will also be able to evaluate the similarities and differences between international liveable indicators against the Malaysian sustainability indices (MURNInets 2012).

This research engages in the combined methodologies involving Focus Group Discussions, Interviews and Perception surveys. The five tenets of the *Maqasid Al-Shari'ah* will be the measurement to gauge at which liveability point a town falls under. Since human lives are in two integral parts; the physical and the soul/spiritual, an analogy of the Yin and the Yang is appropriate where quality of life should strive towards the fulfillment and balance of both these aspects of human lives. Finally, the values and objectives of the *Maqasid Al-Shari'ah* will be incorporated into the conventional town planning practice and incorporate the *Maqasid Al-Shari'ah* principles to be embedded in the conventional liveability indicators of liveable cities.

The research will highlight the weaknesses occurring especially in the vagueness of current planning policies and plan statements, the meaning and the concept of liveability in the *Maqasid Al-Shari'ah* context with its three levels of importance to human lives. Most importantly the superficial or minimal considerations of these values in the process of planning and its implementation will be highlighted.

Finally, the findings of this research will indicate an urgent need for change in the approach and practice of town planning in Malaysia in particular and the planning for world cities in general. Towards this light, developing the Islamic framework of the *Maqasid Al-Shari'ah* will contribute in making the whole liveability planning process of a city become a model to be emulated and applied by practicing town planners, quantity surveyors and architects of the built environment fraternity.

CONCLUSION

Liveability Planning that incorporates Islamic principles of *Maqasid Al-Shari'ah* could be the way forward to genuinely create liveable cities of the future. The spiritual and religious aspects that are found to be missing in the conventional liveable indicators could now be filled up with the five elements of *Maqasid Al-Shari'ah*-cum- indicators to gauge cities liveability levels. However what is most pertinent is not so much about the indicators per se but it is about the human factor itself. Human beings are responsible and accountable as "*Khalifah*" or vicegerents of the earth's resources. They have to consume them in a balanced manner so as to preserve, conserve and sustain them for the present generation and for future generation use. When this is consciously safeguarded, urban communities will live happy lives and finally render their cities liveable. City Managers and Town Planners will have to continually plan, monitor and facilitate developments of cities via Liveability Planning and Development strategies. When this happens, the motto in planning that emphasizes "planning by the people, for the people and by the people" is therefore deemed true in its real sense of liveability planning and liveable cities.

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**ISLAMISATION OF TOWN PLANNING EDUCATION: A REVIEW ON
THE COURSES OFFERED BY THE DEPARTMENT OF URBAN AND
REGIONAL PLANNING, INTERNATIONAL ISLAMIC UNIVERSITY
MALAYSIA**

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Abstract

The Islamisation of the town planning education in Malaysia especially in the Department of Urban and Regional Planning, Kulliyah of Architecture and Environmental Design, International Islamic University Malaysia (IIUM) could successfully be materialized via the smart team-teaching approach where lecturers from the town planning Department collaborate with their counterpart in the Islamic studies Kulliyah. This paper reports a desk study on the status of Islamic inputs in the current town planning course content. Out of 140 credit hours of town planning core courses and University required courses, it was found that 34% have already embodied Islamic-related topics whilst the remaining 66% were silent. Enhancements via compatible Islamic inputs to strengthen the existing curricula need to be done for the former while for the latter new Islamic inputs need to be incorporated. This paper reiterates that the epistemological and methodological approach combined is the way forward for sustainable education.

Keyword: Islamisation, town planning, epistemological, sustainable education

INTRODUCTION

Town Planning education aims at preparing a group of professionals who are able to manifest the sphere of town planning widely accepted as “the art and science of ordering the use of land and the character and siting of building and communication routes so as to secure the maximum degree of economy, convenience and beauty” (Keeble, 1969). Delving into this definition, town planning revolves around questions of accessibility, deployment of resources, land use configuration and visual pleasantness. To attain this aim, planning curriculum has been designed in such a way as to equip students with knowledge on physical planning, management, built environment, technology and professional conducts. The nature and scope of planning continues to be contentious due to its multidimensional and dynamic nature. Thus, in some circumstances, planners often find themselves caught between flexibility and rigidity of town planning guidelines and plans.

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Given this dynamic situation, the need for training, skill upgrading and knowledge enhancement in the field of planning is demanding. This is to ensure the meaning behind the slogan ‘planning for the people, by the people and with the people’ is achievable, or in the Islamic context, it is a manifestation of the human role as a *khalifah* (vicegerent) on earth. However, planning is not alone as far as the built environment is concern. Admittedly, planning is a body of knowledge related to the built and natural environments apart from architecture, land and property management, engineering, quantity surveying, construction technology and landscape design. In this regard, the built environment is a result of humanly made and minds for human comfort and well-being shaped by the context (Bartuska, n.d., p.5).

On the one hand, the built environment body of knowledge appears to have been able to serve its purpose in terms of efforts in ensuring and maintaining Earth’s resources so that it remained in its present form. But on the other hand, the frequent occurrences of floods, pollution, de-forestation, droughts, etc. suggest that man has failed to carry the *amanah* (trusts) as the Earth’s *khalifah* (custodian). To this end, among the question that could be asked is whether man possesses the appropriate knowledge to manage the Earth? In seeking answers to this question, a study focusing on knowledge areas related to the built environment was carried out. In this study, the programme structure and course outlines for the Bachelor in Urban and Regional Planning (BURP) offered by the Kulliyyah of Architecture and Environmental Design, IIUM was chosen as a model to represent the knowledge areas for the built environment. Imbuing with the Islamic paradigm of planning, this paper discusses the Islamic input embedded in the course contents of the BURP in IIUM. This paper is structured under four parts namely an introduction, an overview of the BURP programme, a study on the planning course contents, and a conclusion.

An Overview of the BURP programme at KAED, IIUM

In IIUM, BURP is a degree programme offered under the Department of Urban and Regional Planning, Kulliyyah of Architecture and Environmental Design. It is a four-year degree programme for those who have successfully completed their matriculation programme for the SPM (Malaysian Education Certificate) or GCE ‘O’ level holder and pre-session programme for STPM (Malaysian Higher Education Certificate) or GCE ‘A’ level holder. Other avenues to the BURP programme in IIUM are Diploma in Architecture, Landscape, Land Survey or other built environment-related field and Diploma of Urban and Regional Planning where the holders will enroll into year 2 and year 3 of the programme respectively. Since its inception in 1996, the programme has produced 368 graduates local and international.

Together with the other twelve Kulliyyahs in IIUM, BURP in KAED is translating the IIUM’s vision and mission of becoming a leading international centre of educational excellence which seeks to restore the dynamic and progressive role of the Muslim Ummah in all branches of knowledge and intellectual discourse, thereby actualizing the mission of Integration, Islamisation, Internationalization, and Comprehensive Excellence in every aspect. IIUM was officially established on 20th May, 1983 when the University received its ‘Establishment Order’ from His Majesty the Yang di-Pertuan Agong, HRH Sultan Haji Ahmad Shah Al-Musta’in Billah ibni Al-Marhum Sultan Abu Bakar Ri’ayatuddin Al-

Mu'adzam Shah after an exchange of Diplomatic Notes of co-sponsorship between the Government of Malaysia (host country) and a number of Muslim Governments, namely Bangladesh, Egypt, Libya, Maldives, Pakistan, Saudi Arabia, Turkey and the Organisation of Islamic Countries (OIC). IIUM is the only public university in Malaysia which uses English as its medium of instruction in its everyday operations. In addition, Arabic is used as the medium of instruction for undergraduate and postgraduate programmes in the Kulliyah of Islamic Revealed Knowledge and Human Sciences. By year 2020, IIUM is strategically planning to be a Premier Global Islamic University upholding the six trusts as shown in Figure I where Islamisation is the foundation. Remarkably, on the 17th December 2014, IIUM has been recognised as a Premier International Islamic Research University by the Islamic Educational, Scientific and Cultural Organisation (ISESCO).

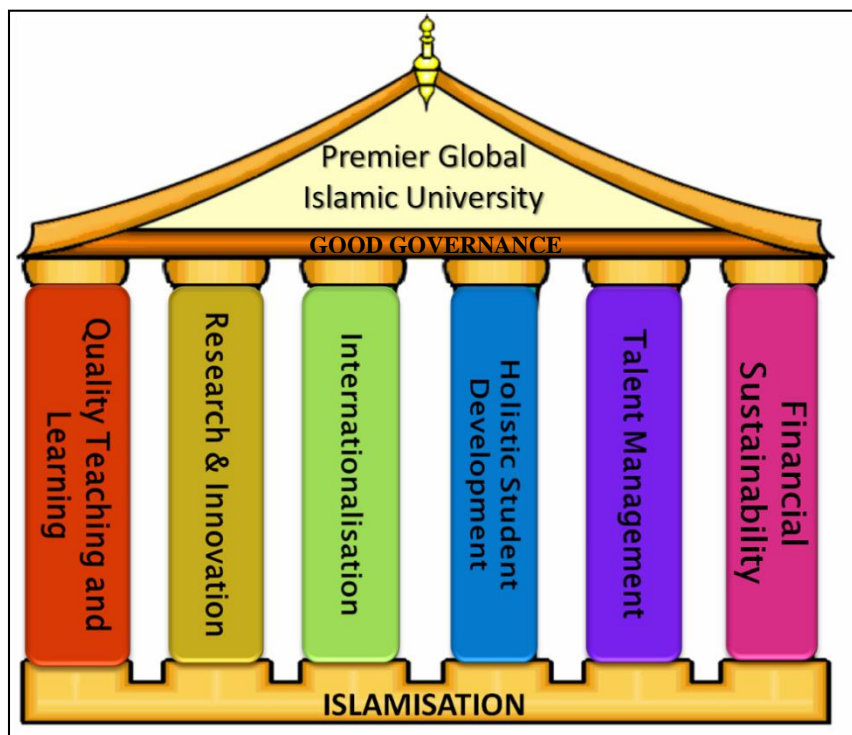


Figure 1: Premier Global Islamic University

With regard to the Islamisation agenda, IIUM has set key performance indicators as follows:

1. Percentage of research, publication and proceedings based on Islamisation of knowledge that are produced in proportion to the total number of staff members.
2. Number of Master and PhD theses completed based on Islamisation of knowledge perspective in proportion to the total number of theses completed.

3. Amount of research and publication funds allocated for Islamisation of knowledge projects in proportion to total amounts of money used for research and publication.
4. Number of nationally and internationally organized seminars, conferences, workshops and related activities based on Islamisation of knowledge perspectives.
5. Level of success in integrating the Islamic values, concepts and perceptions in the curriculum and teaching and learning activities.
6. Number of programmes and course outlines developed based on Islamisation of knowledge input/ perspectives in proportion to total programmes and course outlines.
7. Level of effectiveness of the University Required Courses package and other related subjects in enhancing Islamisation of knowledge in students learning.
8. Level of effectiveness of academic and administrative services in enhancing and achieving the Islamisation of knowledge mission.
9. Number of training and consultation on Islamisation of knowledge provide internally and externally in proportion to the total number of related activities.

The Kulliyah of Architecture and Environmental Design (KAED) was established on the 1st June 1996 to fulfill the need for professionals in the built environment. The Kulliyah offers programmes geared towards integrating Islamic values and the tawhidic educational approach in the built environment profession. This will not only produce graduates who will fulfill the general requirements of the built environment industry, but will also become competent in Research and Development (R&D) activities. Also, KAED seeks to be a centre of excellence in the built environment that promotes Integration and Islamization of knowledge for the benefit of the Ummah. Hence, KAED is committed to serve the Ummah by producing ethical, competent and versatile graduates and to produce quality research in the field of built environment. This is to be achieved through the provision of innovative leadership and conducive working and learning environment by utilizing the state of the art technology.

KAED offers courses related to architecture, urban and regional planning, landscape architecture, quantity surveying and applied arts and design. This is quite similar to other built environment schools as R. Griffiths (2004, p. 711) mentioned that “the built environment disciplines is a term that has come to be used by many UK universities to refer to a range of practice-oriented subjects concerned with the design, development and management of buildings, spaces and places[...]they are a very heterogeneous collection of fields of study and practice including architecture, town planning, land and property management, building surveying, construction technology, landscape design...”.

KAED is structured under five departments namely Architecture, Quantity Surveying, Urban and Regional Planning, Landscape Architecture and Arts and Design. KAED produces qualified architect, quantity surveyor, town planner, landscape architect and designer annually. But the question is how best is KAED preparing them into the related workforce manifesting their role as professional Muslim architects, quantity surveyors, town planners, landscape architects and designers? There are many factors

that contribute to the success of this agenda in which one of them is the built environment curriculum.

Table 1: Number of courses, credit, contact hours and accreditation bodies for undergraduate programmes at KAED as of academic session 2013/14

Programme	No of courses	Credit hour	Contact hour	Accreditation body
B.Sc. (Hons) Architectural Studies	43	120	187	MQA, JPT, JPA, LAM Part II
B. (Hons) Architecture	17	56	74	MQA, JPT, JPA, LAM Part II
B. (Hons) Urban and Regional Planning	46	146	189	MQA, JPT, JPA, Board of Town Planners.
B. (Hons) Landscape Architecture	52	143	204	MQA, JPT, JPA, ILAM
B. (Hons) Quantity Surveying	55	142	185	MQA, JPT, JPA, LJUBM, RISM, RICS (UK)
B. (Hons) Applied Arts and Design	67	144	206	MQA, JPT, JPA

Source: Khairuddin, 2013

The above number of credit hours for each programme offered is included in the 22 credits for the University required courses as in Table 2.

Table 2: University required courses as of Semester 1, 2014/15

Revealed Knowledge	
AAR 1230 Quran, Sunnah and Built Environment	3
UNGS 2030 The Islamic Worldview	3
UNGS 2040 Islam, Knowledge and Civilization	3
UNGS 2050 Ethics and Fiqh for Everyday Life	3
Tilawah al-Qur'an I and II	2
English	3
Arabic I and II	0
Bahasa Melayu Kerjaya (Sains dan Teknologi)	2
Co-curricular	3
Total	22

In the pursuit of Islamisation and its key performance indicators set by the University, Khairuddin and Azila (2012) studied issues and challenges facing the Islamisation of the built environment curriculum and level of Islamic inputs in the courses offered. The study revealed that the Islamisation of course content relies on two factors as follow:

- i. The academic staff who taught the course – the ability to impart Islamic input in the courses offered varies among KAED staff, Part timer/ Academic trainee and non-Muslim staff, subject to the different exposure on the Islamisation agenda

that they have. Therefore, certain methodology for the recruitment process or during their service with the University need to be devised to ensure the continuity and sustainability of the agenda.

- ii. The nature of the courses itself – the technical nature of the courses like computer/graphic application, practical training/degree project, project paper, design thesis and topical studies influence the process of islamisation due to its technicalities where specific methodology is required for its purpose.

The study also revealed few findings on the issues and challenges to Islamisation of knowledge in the built environment, namely:

- a) Educational background of the academic staff
- b) Technical-nature of the subject
- c) Lack of references in the area of Islam and built environment
- d) Absence of proper module on Islamisation framework
- e) Students' intake from both religious and non-religious secondary school

A Study on the BURP's Course Contents

The BURP programme contains twenty-two (22) credit hours of the University required courses as listed in Table 2 above, one hundred and eighteen (118) credit hours for planning core courses and six (6) for elective courses. The objectives of this multi-disciplinary programme, among others, are:

- To train professionals of a very high standard of competency and knowledge in urban and regional planning
- To install a sense of responsibility and commitment to natural heritage and to have the capacity to monitor their well-being for the future generation through understanding the Tawhidic approach to development planning.
- To cater for the higher level of demands in terms of advanced knowledge and skills in the field of urban and regional planning.

Altogether there are ten intended programme outcomes of the BURP in which Islamisation is one of it other than knowledge, practical skills, social skills and responsibilities, attitudes and professionalism, communication and leadership, problem solving and scientific skills, information management and lifelong learning skills, and managerial and entrepreneurial skills.

The content analysis is deployed in reviewing the programme structure and course contents of the BURP. It appears that the following courses content embodied specific Islamic-related topics; however this paper proposes other areas of Islamic inputs to further enhance the knowledge and for future professional practices as illustrated in Table 3 below.

Table 3: Courses with specific Islamic-related topics

COURSES	ISLAMIC-RELATED TOPICS IN THE COURSE CONTENT	PROPOSED AREA OF ISLAMIC INPUTS
1.Site Planning	-Principles of Islamic Planning for town, centres, and public spaces; Housing; Industry; Tourism/ recreation; Waste Disposal; Transportation -Development policies and ethics in the site planning project.	-interconnectedness between the term <i>din</i> (religion) and <i>madinah</i> (city) -the concept of Islamic built environment <i>vis.a.vis</i> . Sustainable development. -feasibility study in Islam.
2.Introduction to Urban Design	-Islamic cities and their built heritage -Islamic Cities; the clash between tradition and modernity	-urbanisation process during the Prophet's time. -planning of the traditional Muslims city during the early Islam.
3. Introduction to Housing	-Islamic housing principles.	-functions of home in Islam. -home as a necessity. -translating functions of home in Islam into spatiality.
4. Social and Community Planning	Doctrine of integral planning and development: -Man-God relationship (justice, <i>ihsan</i> , <i>amanah</i> , respect knowledge) -Man-Man relationship (privacy, space distribution, safety, respect, co-operation, consensus (<i>musyawarah</i>). -Man-Environment relationship (cleanliness, resource planning)	-human beings are collective by nature, al-Hujurat: 13. -islamic principles governing human development embodied in <i>fiqh ibadat</i> (personal), <i>fiqh munakahat</i> (family), <i>fiqh muamalat</i> (society), and <i>fiqh jinayat</i> (crimes and wrongdoings). -human relationship with the Creator, his fellow man and the environment.
5.Economics for Planning	-Income distribution and poverty analysis. -Role of <i>Zakat</i> in poverty alleviation. -Islamic prescription for poverty alleviation. Money markets, <i>Mudharabah</i> and other <i>Shari'ah</i> arrangements. -Monetary and fiscal policies. -Consumer Price Index	-economic planning for human goodness and well-being. - <i>zakat</i> and <i>waqaf</i> as tools to enhance socio-economics of the Muslims. - <i>shari'ah</i> compliance of economic principles and transactions i.e. <i>fiqh muamalat</i> in Islam. -wealth accumulation that bring people closer to Allah.
6. Regional Planning	-Islamic values related to regional planning. -Islamic principles of space organization.	- <i>fiqh al-siyasah</i> (politics) -sharing of resources -consultation, negotiation and tolerance in mutual dealings
7. Aspects of Land Valuation	-Understanding land property concepts. -Definition of land & ownership. -Characteristics & types of land property. -Land interest and property ownership.	-Allah is the owner of the universe -Man is the trustee on earth - sharing of resources for goodness -right of use and enjoyment of property in Islam
8. Planning Theory	-Theory of Islamic planning -Built environment concept in Islam -Environmental design and planning of Islamic perspective -Ethical challenge of Islamic built environment	-human beings are <i>khalifah</i> on earth. -Muslims are religiously bound to plan, design, or construct the earth according to its nature created by Allah. -islamic town planning is an <i>ibadah</i> .
9. Comparative Planning Systems	-There will be a study visit to either one of the following countries:	-lessons learnt from other countries in any of their planning systems that comply with Islamic teachings.

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	Saudi Arabia, Egypt or Turkey, Singapore, Indonesia, Thailand, Australia	
10. Elements of Infrastructure	-Planning public religious amenities - mosque, <i>surau</i> , <i>madrasah</i> , <i>musollah</i> , concept of prayer in Islam in relation to amenity planning, planning guidelines and basic design requirements	-the concept of inviting good and forbidding bad in Islam. -preservation of faith according to the <i>maqasid al-shari'ah</i> . -translation of the Islamic principles into the physical planning
11. Principles of Urban and Regional Planning 1	-Islamic perspective on planning system -Distribution of scarce resources -Sustainability -Total planning doctrine	-human beings are <i>khalifah</i> on earth. -Muslims are religiously bound to plan, design, or construct the earth according to its nature created by Allah. -islamic town planning is an <i>ibadah</i> .
12. Islamic Urbanism	-the civilisation and urbanisation processes in the Islamic cities -Islamic urban settlements, urban forms, building process, planning principles, space and building functions, housing, town centre, mosque, road networks and architectural elements. -Islamic law and neighbourhood building guidelines, community development, environmental conservation. -History of Islamic architecture and urbanism in accordance with the materials, methods of construction, social organisation, and cultural attitudes in different periods of history.	-explained with a <i>tafsir</i> of relevant Quranic verses and <i>hadith</i> . -illustrated and supported with the practices of the Companions and Muslims scholars. -application to contemporary planning

It is therefore advocated that lecturers incorporate other more specific areas of Islamic-related topics into the conventional course content. For the purpose of enhancement and strengthening the application of the Islamic principles in contemporary body of knowledge, besides the compatible areas of Islamic inputs proposed, teaching collaboration with lecturers from the Islamic studies kuliyyah should be instituted. The purpose of the collaboration is to expose the students with the tafsir of the Quranic injunctions and Prophetic Reports related to the topic together with the practices of the Companions and Muslim scholars in early Islam.

Nevertheless, these Islamic-related topics inserted in the planning course outline were doubled illuminated with the University required courses as in Table 4.

Table 4: University Required Courses

UNIVERSITY REQUIRED COURSES – course synopsis	
1. Quran, Sunnah and Built Environment	Acquainting students with the facts on philosophies and principles of the built environment that had been laid down in the Holy Qur'an and the Practices of the Prophet Muhammad. Appropriate verses and text from the Holy Qur'an and Sunnah are referred in the context of the built environment. The origins and first manifestations of the identity of the built environment distinctly came into sight during the time of the Prophet and the first generation of Muslims are scrutinised.
2. The Islamic Worldview	Focusing on the meanings, characteristics and kinds of worldviews including some selective contemporary ideologies, such as materialism, secularism and post modernism. It presents an overview of Islam and its main characteristics, also describes the elements of Islamic worldview and reviews some of the contemporary challenges facing man and society.
3. Islam, Knowledge and Civilization	Dealing with the basic issues that lead to a good understanding of the theory of knowledge and civilization from the Islamic and the non-Islamic perspectives. It describes the contribution of Muslim scholars and scientists in different fields of knowledge and science throughout the history of the Muslim civilization, also reviews some contemporary challenges facing the Muslim <i>Ummah</i> and the possible solutions to overcome them with reference to the concept of <i>Islam Hadhari</i> .
4. Ethics and Fiqh for Everyday Life	Consists of two parts: a) Islamic ethics, b) <i>fiqh</i> for everyday life. The first part focuses on core Islamic ethical concepts, family ethics, and Islamic ethics as applied in different professions, inter-personal ethics, and ethnic relations. The second part deals with general view of Islamic <i>fiqh</i> and its schools, <i>maqasid al-shari'ah</i> , major bio-ethical and financial issues.
5. Tilawah al-Qur'an I and II	Familiarise the students with the rules of reading the Qur'an (<i>tajwid</i>) and memorisation skills.

Meanwhile, the other planning core course which is silent on the Islamic-related topics is worth mentioning here in the pursuit of Islamisation. Following the 22 modes devised by the Centre for Islamisation (CENTRIS), IIUM (Appendix 1) these courses might fall under any of the modes outlined.

Reviewing the content of the course outlines where the Islamic-related topic is not mentioned specifically suggest that the Islamic inputs could be in term of values and ethics. With the insertion of the Islamic-based values such as knowledge, systematic, critical and analytical thinking, teamwork, networking, da'wah, accountability, transparency, honesty, punctuality, justified decision making, leadership, talented, ikhlas, efficient, proactive, respect, trust, preservation of *maqasid al-shari'ah*, Islamic environmental ethics, self-conscious and etc. under the notion of inviting good and forbidding bad, the percentage of Islamic input in the courses will increase tremendously. These Islamic attributes when doubled up with the team-teaching lecturing mode will result in a more robust Islamisation process of the town planning education.

Based on the credit hours calculation, 34% of planning courses offered by KAED embodied specific Islamic related topic, while the remaining 66% is silent. Therefore this study identifies proportion of Islamic related topic and non-specific Islamic related topic appeared in planning curriculum shown in Table 6.

Stemming from the issue of the educational background of majority of the academic staffs in the built environment who are from non-religious educational background, the paper proposes team-teaching with lecturers from the religious studies

department. Prior to the teaching commencement, there must be a discussion between both lecturers from the department of the planning and the Islamic studies so that the content to be delivered will be more compatible and meeting the expectation. This team-teaching strategy will integrate the Islamic insights into the contemporary planning body of knowledge directly that will flourish the Islamisation agenda. At the end of the programme, students are expected to grasp the following ideas from the planning education:

- i. Town planner as a khalifah
- ii. Town planner's work as an ibadah (Allah worshipping)
- iii. Al-Qur'an and al-Sunnah as a source of planning decision-making tool via ijtihad
- iv. Interconnectedness between din (religion) and madinah (city) as a planning basis
- v. Belief in reward and punishment in the Hereafter for every planning undertaking.

More importantly, the planning curriculum must be able to meet the ultimate aim of the shari'ah that is the preservation of the following:

- i. Faith – curriculum that would enable students to embrace the presence of Allah in every human undertakings, acts or omissions, directed by His revelation through the Al-Qur'an and Al-Sunnah.
- ii. Self – curriculum that would enable students to embrace the greatness of Allah in creating human beings thus directed people to perform their role as khalifah in acts or omissions towards fellow men and the environment.
- iii. Intellect – curriculum that would enable students to acquire the intellectual skills and knowledge to understand the subject matter of any kind or branch of contemporary knowledge and able to appraise what is right and what is wrong according to one's Faith.
- iv. Lineage – curriculum that would enable students to appreciate the collective nature of human beings thus giving rise to the practice of Islamic values and etiquette in society, inviting good and forbidding bad.
- v. Property – curriculum that would enable students to acquire skill and knowledge to ensure that physical development are being developed with value for money, sustainable and lasting with minimum maintenance.

Indeed the preservation of these five elements of the Maqasid al-Shari'ah is in line with the spirit of the Malaysian Shari'ah Index launched on February 10, 2015 by the Prime Minister. Infrastructure and the environment forms one of the sectors under scrutiny by the government apart from other seven sectors that have been emphasized in the Malaysian Shari'ah Index. Thus, it is timely for the town planning education in the tertiary learning institution pioneered by KAED, IIUM to gear up towards inculcating the Islamic inputs in the planning curriculum.

Table 5: Planning Core Courses without specific Islamic-related topic mentioned

NON-SPECIFIC ISLAMIC-RELATED TOPIC MENTIONED IN THE COURSE CONTENT	
1. Project Management For Built Environment	Various aspect of project management starting from project initiation up to project completion in ensuring the project objectives of time, cost and quality are achieved. The various technique of project planning, organizing and controlling be taught including the use of specialised computer applications. The importance of human aspects of project management will also be highlighted.
2. Professional Planning Practice	A detailed understanding of the professional planning practice in Malaysia with some references on planning practice in the United Kingdom. Among other things, students will be exposed to the nature and scope of work of town planners in the public and private sectors, its relationship with other professions in the built environment, professional services, procedures in plan-making process and the roles of town planners in developing the <i>Ummah</i> .
3. Public Administration And Finance	Administrative and financial aspects of urban and regional planning as well as scope of planning, spatial levels of planning, organisation management, machinery of planning administration, relationship between Federal, State and Local Government will be taught to students.
4. Project Impact Assessment	The environmental issues and its various types of impacts to the surrounding. As such, it is important for planning students to inculcate this knowledge as planning deals a lot with development of natural resources.
5. Planning Law And Procedure	An understanding on laws relating to town and country planning. Laws relating to town and country planning branches including environment, socio-economic, land use, traffic and etc. Each of these planning subjects is regulated by law for their operating process to ensure its efficiency and effectiveness. Therefore, this course covers those related statutory provisions embodied in Town and Country Planning Act 1976, Local Government Act 1976, Environmental Quality Act 1974, National Land Code 1965, Street, Drainage and Building Act 1974, Uniform Building By-Laws 1984 etc. Students will be involved with field studies, attending Appeal Board sessions or hearings on planning disputes.
6. Planning Techniques	Various techniques/ tools which are applied in different phases of the planning activities. As such the course contains the following topics: definition of planning and different conceptions of planning; planning process and techniques; strategic planning and SWOT analysis; planning information – types & sources; forecasting techniques; models in planning; population analysis and projections; land use analysis; economic base analysis and employment forecasting; plan evaluation techniques; plan implementation and communication techniques.
7. Planning Theory	Overviews of literature on planning theories and philosophies; explanations of a conceptual framework for planning thought, positive planning, traditional planning, organizations, decision making, the politics of rational planning, political and social contexts of planning. It examines planning as a communicative process from formulations of complex issues to proposed actions. The role of debate, arguments, objection, participation, documents and basic forms of planning processes are presented. It also attempts to survey the broad areas of how planning is practiced and the problems faced by planners. Attention is also given to the concepts such as mode of planning, style of planning, implementation structures and organizational processes that act as heuristic approaches in the planning process.
8. Principles Of Urban And Regional Planning 2	Continuation of the Principles of Urban and Regional Planning 1. Factors that influenced planning and decision making processes including government intervention, scarcity of land, pursuit of economic growth, society aspirations and needs, and pursuit of sustainable development objectives.
9. Geomatic	Provides an overview of (a) Land Surveying – Fundamentals of land surveying concepts, technology and applications; (b) Remote Sensing - Fundamentals of satellite and aerial remote sensing concepts, technology, and applications. The fieldwork and laboratory sessions consist of hands-on exercises that are intended to broaden student understanding of Geomatics.

10.Planning And Decision Support System	Understand how planning decisions have been made to ensure resources can be fully utilised and sustained To provide planning scenarios, to choose some options in planning, to analyse consequences and to provide trade off, to project future needs and land allocation, and to monitor the implementation of plans.
11. CAD &Multimedia For Planning	An exploration of the variety of CAD and graphic tools available for modelling, understanding and presenting design proposals. Applications explored include 2D and 3D, simple visualisation, image editing and composition and the crossovers possible between these various techniques. Conceptual modelling techniques for design process and their relevance to the design studio will be discussed.
12.GIS Application For Built Environment	Topics covered in this subject are the history of GIS, components of GIS, hardware and software requirement, raster and vector GIS, projections, data structure and concepts, data acquisition, making spatial data usable, getting attribute data into GIS, database management, data manipulation and analysis, metadata, product generation and customization.
13. Urban Traffic System	Urban traffic system is a part of transportation study. It is important to urban and regional planning field in order to provide accessibility by road network planning. This course offers understanding on various topics such as road traffic trends in urban areas, the impact of natural condition, road and vehicular characteristics, traffic survey, highway capacity, road and intersection design, traffic signal design and operation, parking study, and traffic management.
14. Transportation Planning	Transportation is concerned with the movement of people and goods. The study of movement between places (land uses) for various purposes by using different types of transportation mode is considered as one of the main aspects in transportation planning. The course covers several topics related to the present transportation problems, service operations, urban travel behavior, transportation planning model and transportation system management. The course is also designed to give students a thorough grounding in understanding transportation planning system and methodology.
15.Research Method For Built Environment	Approaches to research methodology which can later be used in writing their theses. Focusing on the understanding of the nature and types of data, collection of data, sampling technique, methods of data analysis and report writing.
16. Project Paper	Develop students' ability to identify planning problems and provide solutions to the problems. Formulate problems for research, literature review, field and library research, elements of sampling, data analysis, data presentation and interpretation, writing reports. Skill acquired by student is research and inquiry through identification of problems and finding solutions to identified problems.
17.Practical Training	The objective is to produce intellectual and competent students through the real practices of town and country planning. Practical training will be conducted at various government departments, agencies and private firms that have been approved by the Department. At the end of the practical training session each students is required to submit a written report detailing his task and experiences during the practical training period.
18.Planning Studio 1	Understanding of basic planning technical skills. It covers topics on planning issues, problems, standards and guidelines, types of plans and scales, cartographic presentation, layout evaluation, site investigation, and inventory and analysis. Studio projects will incorporate regulations, standard and planning guidelines knowledge for planning various types of land use. Islamic working ethics such as unity, team work and respecting the knowledge will be introduced in the studio projects as a preparation for working life.
19.Planning Studio 2	Related to site planning, layout design and master plan preparation. Students are guided to conduct literature reviews related to mixed development. Inception and Technical reports will be prepared to support the layout plan making and its master plan for a mixed development.

20.Planning Studio 3	The preparation of a statutory development plan called Special Area Plan (<i>RancanganKawasanKhas</i>). Reference is made of the provisions under Town and Country Planning Act 1976 (Act 172).
21.Planning Studio 4	The preparation of a statutory district local plan under the Act 172. The course will cover the investigation of housing, land use, transportation, environment and others. Modelling and forecasting techniques will eventually be used to analyse the existing condition and then wisely predict the future condition. Students are required to produce a draft District Local Plan for the study area, which will consist of major projections of what the future land use would be and the accompanying policies and detail proposals which take into consideration the wider contexts of neighbouring developments and statutory development plans on the higher tier of the hierarchy of development plan.
22.Planning Studio 5	The preparation of a statutory state structure plan at a strategic level under the Act 172. The course will cover the investigation of housing, land use, transportation, environment and others. Modelling and forecasting techniques will eventually be used to analyse the existing condition and then wisely predict the future condition. Students will be required to produce a draft State Structure Plan for the project area which will consist of major projections of what the future land use would be and the accompanying policies and general proposals which take into consideration the wider contexts of regional developments.
23.Planning Studio 6	The preparation of Development Proposal Report (DPR). Students are required to conduct detailed literature reviews related to a large scale and futuristic type of development. Feasibility and Market Study report and Technical report will be prepared as well to support the preparation of DPR.

Table 6: Proportion of Islamic Input in the Planning Courses

Course content	Planning core courses (No. Of Credit hours)	University required courses (No. Of Credit hours)	Total (Credit Hours)
Specific Islamic-related topic	34	14	48 (34%)
Non-specific Islamic-related topic	84	08	92 (66%)
Total (Credit hours)	118	22	140*

*Six credit hours of elective courses are excluded from the study

CONCLUSION

While efforts in Islamisation in the town planning curriculum have been instituted and practiced in KAED since its inception in 1996, there are still room for further improvements and enhancements. Now, after almost two decades, this study evaluates and reviews the past and present course outlines and see where the areas that need better Islamic contents for future courses are. This paper offers two concrete proposals. One is the detailed subject contents and the other is the team-teaching strategy between lecturers of the Town planning department and the Islamic Studies department of IIUM. This two-prong approach is thought to be an effective mechanism for IIUM in its long term Islamisation of knowledge and be a leader in this mission, not only for Malaysian Universities but for the world at large.

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Appendix 1

1. Accepting, appreciating, acknowledging, affirming, promoting, supporting or perpetuating useful secular-based conventional knowledge, without making serious efforts to develop, integrate or incorporate Islamic worldview into the subject matter.
2. Undertaking, doing or involving in normal, ordinary quality research, publication, consultancy, public service or social work, in harmony with the worldview of Islam.
3. Enjoining, encouraging or adopting that which is considered useful in secular-based conventional systems, after undertaking serious and objective analysis of its compatibility with the Islamic worldview/principles.
4. Improvising or adapting the acceptable or compatible secular-based conventional systems without undermining the principles of Islam (especially when the Islamic solution is not present at the moment in contemporary Muslim societies to serve as better alternatives).
5. Describing, explaining or analyzing in a scholarly and objective manner any secular-based conventional systems without showing in what ways are the Islamic different or more desirable.
6. Undertaking, doing or involving in useful, or good quality research, publication, consultancy, public service or social work, in harmony with the worldview of Islam.
7. Correcting, amending, removing or deleting some aspects of secular-based conventional knowledge which have been evaluated from Islamic worldviews and found to be unacceptable as they are.
8. Comparing or contrasting the secular-based conventional aspects with the Islamic-based counterparts, with the purpose of demonstrating how the Islamic alternatives are better and more desirable.
9. Presenting, promoting or articulating Islamic perspectives on aspects of human knowledge in various fields which are constructed or based upon the worldview of Islam.
10. Serious critiquing and/or critical assessment or evaluation of aspects of secular-based conventional human knowledge—insofar they are not in harmony with the worldview of Islam.
11. Integrating, incorporating or injecting—where necessary—Islamic worldview into the acceptable aspects of secular-based conventional human knowledge for a better and more correct understanding of the holistic nature of truths of human realities.

12. Refuting, rejecting, prohibiting, discouraging, objecting, countering, repelling or deconstructing all aspects of human knowledge which are opposed to Islamic worldviews/principles.
13. Defending, protecting, supporting Islamic perspectives vis-à-vis the unjust criticisms or attempts to undermine or discredit Islam.
14. Reorienting aspects of acquired human knowledge after carefully examining and critically identifying the unacceptable or objectionable aspects from non-Islamic religious beliefs.
15. Synthesizing or harmonizing or enriching the positive and acceptable aspects of secular-based conventional knowledge with the relevant Islamic principles.
16. Undertaking, doing or involving in very useful or high quality standard research with the worldviews, principles, ethics and values of Islam.
17. Discovering, revitalizing, operationalizing, or reinterpreting in a positive way the useful knowledge from the rich Islamic intellectual and civilizational legacy and making them relevant and applicable to the contemporary period as problems solving tools.
18. Producing important and highly desirable new inventions in the form of academic or scientific tools which may have high economic potential thus manifesting the creativity and innovativeness of Muslims.
19. Reconstructing or providing significant alternatives to major or dominant secular-based conventional thoughts based on the Islamic worldviews.
20. Constructing new and highly significant human knowledge based on the worldview of Islam.
21. Undertaking and excelling in outstanding or extremely useful or very high quality standard, research, publication, consultancy, etc. with the worldview of Islam.
22. Re-examining, reassessing, re-evaluating, reintegrating, restoring or reviving of selected classical Islamic thought and works with the aim of highlighting their contemporary relevance, usefulness or otherwise.



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SPATIOTEMPORAL LAND USE AND LAND COVER CHANGE IN MAJOR RIVER BASINS IN COMPREHENSIVE DEVELOPMENT AREA

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Abstract

Urbanization has significantly transformed spatial configuration of landscape structure which is triggered by population growth and government's development policy. As a consequence, the changes disturbed the quality of natural environment and ecosystem. Historical experience and prediction of future land use and land cover change is important to understand the spatial characteristics and environmental consequences of development area. Evaluating the spatiotemporal in urban development is essential as an important component improving adaptive management in landscape planning. Thus, the objective of this paper is to discuss the spatiotemporal land use and land cover change in major river basins (Sungai Tebrau, Sungai Skudai, Sungai Pulai and Coastal Zone) in the rapid development region of Iskandar Malaysia. The past experience indicates rapid growth of population and substantial urban development changed the spatial structure of the region and there is tremendous transformation of land use and land cover in the present due to high demand for development. Analytical Hierarchical Process (AHP) and CA-markov chain model were used to analyze the relationship of variables and formulate the future spatial changes. Then landscape index is used to analyze the spatial characteristics of the changes. Remote sensing data and GIS were used to conduct the analysis for the study. Temporal satellite images between 2002 and 2013 were utilized as input data for the past changes and basis for future land use and land cover change projection (2020, 2025 and 2025). The result indicates different character of urban landscape changes in different periods and river basins. Past experience shows the significant change of agricultural and natural land converted into artificial land use especially in Skudai and Tebrau river basins. In addition, there was conversion of water body for development in the past especially along the river banks and coastal area in Johor Bahru city center. This trend will constantly restructure the existing landscape as projection shows the significant impact of future development. This situation could contribute to other possible issues such as microclimate change and increase run-off water, pollution and degradation of ecological values and services. This study provides a platform for decision-makers to interpret the situation of landscape structure change in relation with environmental consequence in the study area. Future development plan should thoroughly consider the character of future spatial development and anticipate the possible effect on the environment in the region.

Keyword: LULC; GIS; spatiotemporal; river basin; landscape index

INTRODUCTION

In the past decades, rapid land use and land cover changed due to high demand for urban land uses such as residential, commercial, industrial, infrastructure and utilities especially in developing countries. High population growth and evident policy evolution increased demand for more spaces that resulted in rapid urbanization. In relation to this, it is estimated that global urban population will be 3.8 billion in 2015 and expected to achieve 5 billion people in 2030 (Unesco, 2010). Thus, urban development will continue modifying the landscape structure globally. More artificial land uses will replace other landscapes and consequently disturbing environmental quality. In particular, the increasing artificial surfaces from various types of development areas could be the potential source of pollution within watershed area (Tanga et al., 2005; Xiana et al., 2007; Edwin et al., 2010 and Mark et al., 2011). Many past studies show significant impact of land use and land cover (LULC) change contributing to source for pollution and removing the existing landscape and increase exposure to other problems (Carlson et al., 2011; Youa et al., 2012; Wang et al. 2012; Chu et al., 2013 and Fu et al., 2014). This will be more critical as future development will restructure the landscape and could contribute to negative issues in the environment.

Spatiotemporal study is important to understand the possible characteristics of spatial changes in past and future landscape. The dynamic change information is essential for experts to predict the possible impact of the changes towards environment (Lathrop et al., 2007; Sun et al., 2012 and Xu et al., 2013). In undertaking the study, GIS and remote sensing are important tools in analyzing the spatiotemporal of LULC change. Remote sensing provides a series of spatial features information with spatial pattern dimension and temporal changes (Frondoni et al., 2011; Wang et al., 2012). It illustrates the composition and configuration on the earth surface which relates to the land use activities. Meanwhile GIS is capable to handle spatial data and conduct analysis for the spatiotemporal study. Spatial analysis in GIS particularly is able to visualize the spatial dimension for the future development. Then, the analysis is enhanced when landscape indices specifically describes the composition and configuration spatiotemporal of land use and land cover change (Fan and Myint, 2014).

For further understanding of urbanization and spatiotemporal changes, the study was conducted in the comprehensive development region of Iskandar Malaysia (Johor Bahru). Previously, Johor Bahru especially has experienced significant change of LULC characteristics in recent years. Due to the implementation of new policy, presently there is no sign of slowing down the development. The rapid changes are related to the fast population growth in this area in line with the evolution of the policy to elevate Johor Bahru as a city of international standing (Figure 1). Thus, large areas have been converted into urban land use and the trend will continue as population and demand for spaces increase in the future.

Iskandar Malaysia region is now a comprehensive development region that covers 221 634.1 hectares (2 216.3 square km) of land area at the most southern part of Johor consisting the whole of Johor Bahru district and some areas in Pontian district. Previously, the study area was rich with ecological components such mangrove areas, swampland along the coast and rivers. Agriculture was also the dominant land use covering almost 70% of this area. Within the large agriculture land, natural forest areas were scattered with different configuration and compositions especially along the coastal zone. In

economic activities, Johor Bahru particularly is an important region that experienced large economic concentration and various spatial changes since 1990s. Now it has become one of the prominent cities in Malaysia having high competitive development especially for commercial, industrial and residential sectors. Population has grown considerably with enormous immigration of people from surrounding areas. As a result, large land use and land cover has significantly changed due to this rapid socioeconomic development and change the overall landscape. For the purpose of the study, the focus study area is in the major river basins within the region such as Sungai Pulai, Sungai Skudai, Sungai Tebrau and the coastal area around the city center of Johor Bahru (Figure 2).

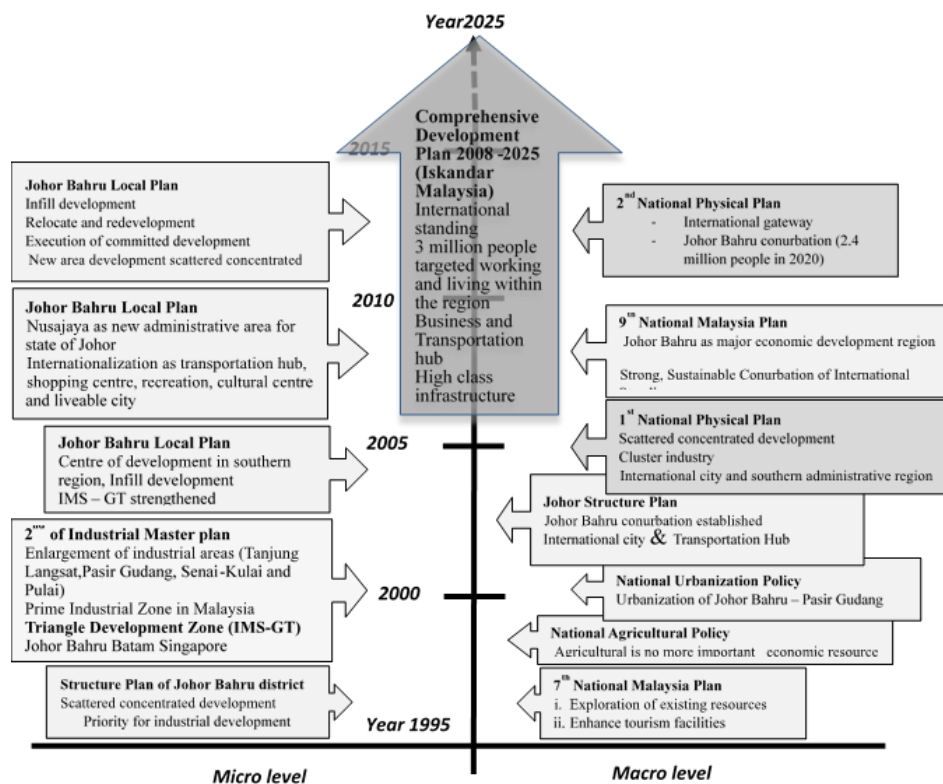


Figure 1: Temporal policy dimension changes in Johor Bahru



Figure 2: The river basins (study area) in Iskandar Malaysia region

OBJECTIVE AND METHODS

The objective of this paper is to discuss the spatiotemporal land use and land cover change in the three major river basins in Iskandar Malaysia region. It is important to understand the characteristics of land use and land cover of the study area related to the quality of river basin in this area. Besides that, this study references the requirement of adaptive management for observing and predicting the consequence of environmental problems. Several steps were involved in this study such as identification of the focus and study area, data collection, database development, image processing and data analysis (Figure 3).

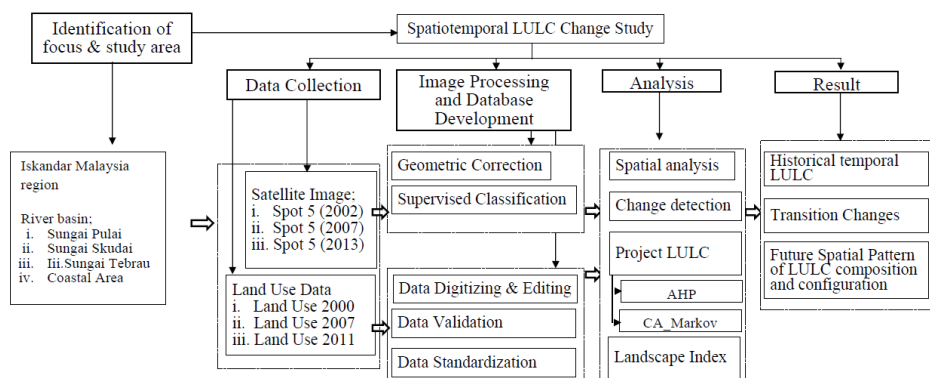


Figure 3: The sequence and methods involved in this study

Data Collection and Database Development

This temporal study focused on the historical experience and future spatiotemporal LULC change from 2015 to 2030 with regard to significant policy evolution. The past experiences were used as a basis for projecting the land use and land cover in the region. Series of temporal data was collected which includes a series of satellite images (2002,

2007 and 2013) and other land use information. The Spot 5 satellite images with 10x10 meter accuracy were obtained from ARSM (Agencies of Remote Sensing Malaysia). The images are registered into Rectified Skewed Orthomorphic of Malaysia (RSO) coordinate system. Then by using supervised classification method the images were classified into five categories such as natural, agriculture, water body, built up and open land. Meanwhile, the land use data was collected from several sources in different formats. Past land use data was developed by referring to the printed documents. Land use in 2000 was digitized by referring to the past Local Plan of Johor Bahru and Structure Plan of Johor Bahru. Land use data in were 2007 and 2011 collected from secondary sources and then were transformed into standard format.

Method of Analysis

There are three sections of analysis in this study which is firstly to identify the historical character of change and secondly, to project the future spatiotemporal lulc change in the study area. Then, the landscape index analyzes the composition and configuration of the spatiotemporal changes in the past and future changes. The analysis reveals different characteristics of spatial pattern in the river basins. In the first part of analysis, the spatial analysis performs the transition of change analysis and indicates the location and type of the past changes. Similarly, the same method is used in analyzing the future change besides interpreting the configuration and composition of the change. Comparison of the LULC changes and trends from 2015 to 2030 is measured to reveal the behavior of the changes and impact on the river basins. Several software were used in this study such as Erdas Imagine, Idrisi Selva, ArcGIS and Fragstats to run the analysis.

In the second part of analysis, the projection of the LULC is based on the period from 2007 to 2013. This period is chosen because of apparent transformation with the current situation as well as in line with the starting point of the comprehensive development policy. Meanwhile the transition probability for urban changes is calculated based on a series of variables within the components of existing urban areas, transportation network, geophysical condition and development policy engagement. The map was created through input from analytical hierarchical process (AHP) which shows the priority area for future development.

The final part of analysis is analyzing the composition and configuration of LULC in the river basins from 2002 to 2030. This analysis is important to reveal spatial pattern of development and remaining natural areas in those river basins within the periods. Several matrices were selected at patch and landscape levels with regard to the required information to reveal the spatial composition and configuration of lulc change (Table 1). Those matrices were translated in spatial statistics package in Fragstats software developed by MacGarigal in 2002. In this stage, raster data format is used to calculate the spatial pattern characteristics of the LULC in the study area. Then, statistical table from the calculation was translated into graphs for better understanding of the LULC characteristics in the study area.

Table 1: Selected landscape matrices to measure LULC characteristics of the study area

Matrices	Abbreviation	Description	Unit
Percentage of landscape	PLAND	Total percentage of land use type compare to whole landscape.	Percentage
Number of patches	NP	Total number of patches in the landscape.	None
Mean patch size	MPS	The mean patch index quantifies based on the accumulation of patches in the same type.	Percentage
Shannon's diversity index	SHDI	Equal minus the sum, across all patch type, of the proportional abundance of each patch type multiplied by that proportion.	None
Shannon's evenness index	SHEI	A measurement of patch diversity, which is determined by the distribution of different types of patch in landscape.	None

Source: Adopted from McGarigal, 2002

URBANIZATION AND LANDSCAPE CHARACTER CHANGES

LULC Change

The primary findings show that there was significant change of the land use and land cover in the past in the study area. It is obvious different trends of land use changes can be seen in the different periods of the study due to evolvement of urban development. The urban area has replaced the surrounding natural and agriculture areas and directly changed the overall landscape composition of the river basin in the study area (Figure 4 and Table 2). The total urban land of 22387.65 hectares in 2002 increased to 22 441.31 hectare in 2007. In 2007 rapid urban development started due to the implementation of the comprehensive development plan in Iskandar Malaysia and shows that the urban land enlarged enormously. As a result, the total urban land increased to 64 5954.7 hectares in 2013. The changes significantly change the composition of every river basin in this region (Table 2).

In relation to the policy evolution, built up area was significantly increased from 2007 to 2013 due to the expansion of Johor Bahru city center. Thus, the most rapid changes of the landscape pattern are in the Tebrau river basin where urban land has increased significantly. There were lots of green vacant land and agriculture areas that have been converted through infill development and edge expansion. The trend is in line with the policy that focussed on the scattered concentrated and infill development. In addition, overspill of urban sprawl from Johor Bahru city centre has contributed to new development in the surrounding areas. There was significant change of urban land development in other river basins between 2007 and 2013 especially in the coastal zone and Skudai river basin.

Table 2: The percentage of land cover in all the river basins in 2002, 2007 and 2013

River Basin	Coastal Zone			Sungai Skudai			Sungai Tebrau			Sungai Pulai		
Land Cover	2002	2007	2013	2002	2007	2013	2002	2007	2013	2002	2007	2013
Bare Soil	9.11	4.60	13.03	15.16	6.26	13.91	11.51	7.81	18.07	6.33	5.70	11.88
Built Up	14.00	23.52	29.87	24.72	27.20	32.74	30.82	29.00	34.94	7.21	9.56	15.26
Green/ Agriculture	38.25	40.18	30.64	47.36	50.41	43.66	47.04	53.05	38.46	37.9	41.12	32.33
Forest	26.44	19.65	15.42	11.33	14.92	8.41	9.45	9.02	7.53	37.11	33.76	31.64
Water Body	12.20	12.05	11.04	1.43	1.21	1.28	1.18	1.12	1.00	11.45	9.86	8.89
	100	100	100	100	100	100	100	100	100	100	100	100

Urban land enlargement in the study area is analyzed to characterize the urban land use transition. In the first period (2002-2007), agriculture land was the largest converted area to urban land with 8 466.2212 hectares covering 68.87% from the total conversion (Figure 5 and Table 3). Meanwhile, the Tebrau river basin was the biggest area transformed in the first period and agriculture land was the major area converted into urban land with 2 890.85 hectares. It shows that the urban sprawl of Johor Bahru city center was spread out a different magnitude being more concentrated towards Pasir Gudang region. This pattern is due to the policy that allocates this area as the main industrial area in Johor Bahru and agriculture as less important of economic activities in this region. Moreover, the enlargement of the industrial area is in regard to the policy to strengthen up industrial activities which subsequently increased the urban land footprint in the following periods (2007-2013) in the Tebrau river basin.

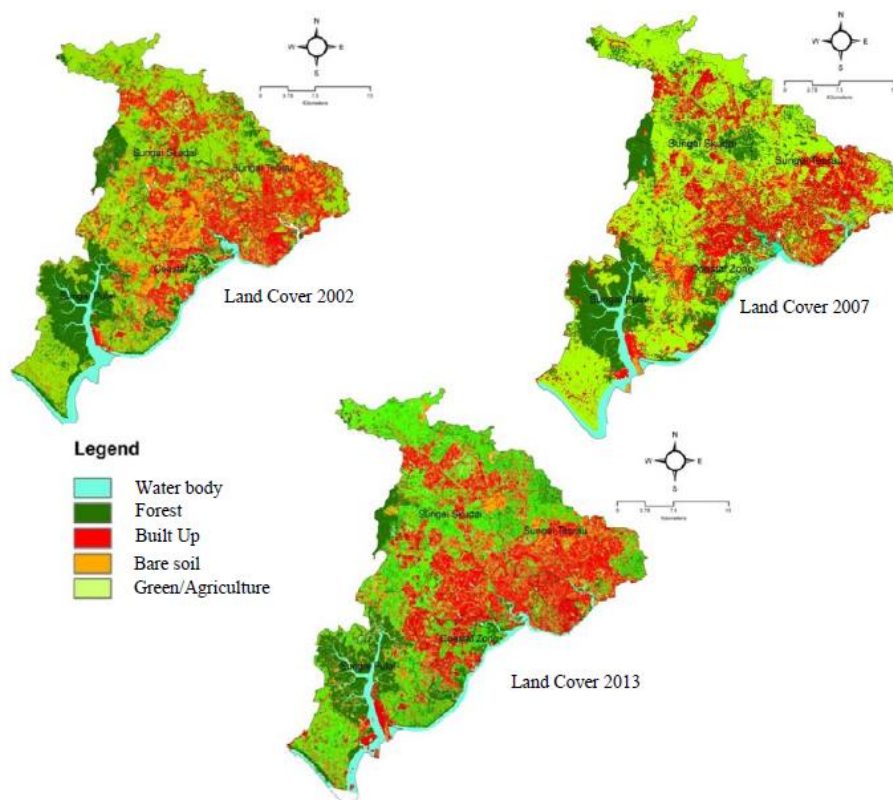


Figure 4: The spatiotemporal dimension of land cover change for the study area from 2002 to 2013

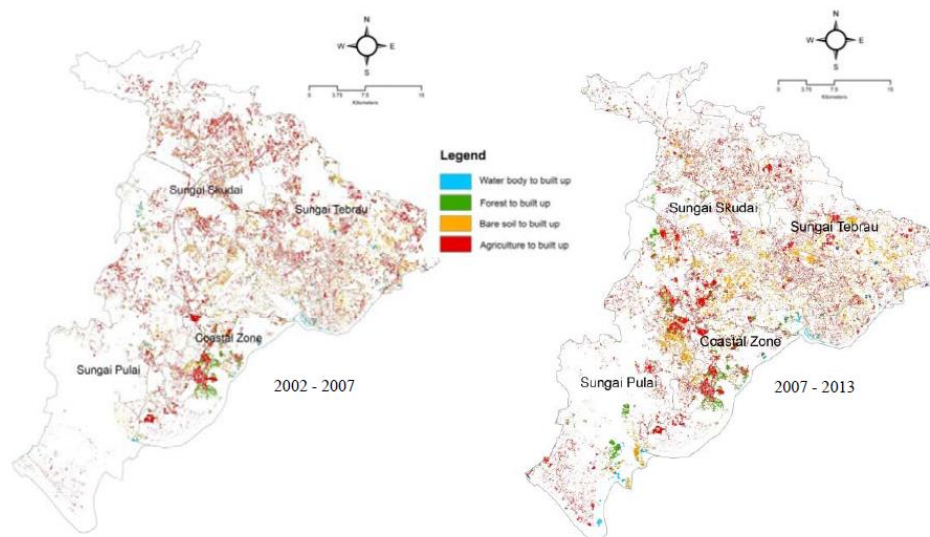


Figure 5: The figure shows the transition of land cover change towards built up areas in all the river basins

Table 3: Transition matrix of the conversion of land cover towards built up areas between 2002-2007 and 2007 – 2013

Period	2002-2007									
Basin	Sg.Tebrau		Sg.Skudai		Sg.Pulai		Coastal		Total	
Land cover	(Hec.)	%	(Hec.)	%	(Hec.)	%	(Hec.)	%	(Hec.)	%
Water Body	64.78	1.59	24.35	0.61	28.31	1.65	88.57	3.97	209.8666	1.71
Forest	330.24	8.13	377.4	9.47	273.47	15.95	458.26	20.55	1472.9201	11.98
Bare Soil	777.52	19.13	756.91	19.00	208.01	12.13	351.53	15.76	2144.2356	17.44
Agriculture	2890.85	71.14	2826.28	70.94	1204.75	70.27	1331.99	59.72	8466.2212	68.87
Total	4063.39	100.00	3984.94	100.02	1714.54	100.00	2230.35	100.00	12293.244	100.00
Period	2007-2013									
Basin	Sg.Tebrau		Sg.Skudai		Sg.Pulai		Coastal		Total	
Land Cover	(Hec.)	%	(Hec.)	%	(Hec.)	%	(Hec.)	%	(Hec.)	%
Water Body	61.65	1.57	57.46	1.19	127.22	3.54	105.88	5.39	352.21	2.46
Forest	242.79	6.18	555.18	11.53	633.13	17.62	552.36	28.13	1983.46	13.87
Bare Soil	1155.17	29.40	1259.69	26.17	846.87	23.57	316.75	16.13	3578.48	25.03
Agriculture	2468.92	62.85	2941.67	61.11	1986.25	55.27	988.45	50.34	8385.29	58.64
Total	3928.53	100.00	4814.00	100.00	3593.47	100.00	1963.44	100.00	14299.44	100.00

Meanwhile, the Sg. Skudai river basin shows the total conversion area towards urban land is 3 984.94 hectares between 2002 and 2007 (Table 3). Similarly agriculture land was the largest area converted into urban land with 2826.28 hectares. The Pulai river basin and coastal zone areas also have significant changes in their existing land cover. Critically, the conversion in the first period in both basins shows that the water body area has been converted extensively. The reclamations of land for urban development along the coastal areas show the replacement of urban land with total 88.57 hectares between 2002 and 2007. Then the enlargement of the transportation hub (Tanjung Pelepas port) shows another significant change of water body to urban land with a total conversion of 28.31 hectare in the Sg. Pulai river basin. As urban development sprawled to the outskirts of Johor Bahru city centre and the demand for urban land use increased, showing the conversion of water body in Tebrau river basin and Skudai river basin with 64.78 and 24.35 hectares respectively. The change of the water body was mostly related to the development of housing area in the river banks directly attached to the rivers. This development trend basically involved the preferences of people want attaching to the serenity of the natural ecosystem.

In the following periods (2007-2013), the total area converted to urban land was 17 450 hectares. Similarly agriculture land was the largest area converted to urban land at 60% of the total conversion. However, the Sg. Skudai river basin saw the largest area converted to urban land with 4 818.00 hectares of new development expanded towards Senai and Kulai along both sides of Skudai river. The direction of urban development has changed due to more spaces available in this area as well as in response to increase socioeconomic activities in this direction. The conversion is parallel to the policy stated for the district to enlarge the industrial zone in Johor Bahru district and promoting other land uses such residential and utilities largely developed to fulfill the rapid population growth. More agriculture areas declined with the distribution of development expanding the existing development area. This situation converted all the previous surfaces along the riverbanks to different kind of land use activities. The development processes has removed vegetation from the earth surface and abandoned open soil for a period of time.

Based on the current rapid development, the study has projected the future LULC change in the study area. The implementation of the comprehensive development in this region shows a significant change of urban land in all river basins (Figure 6). It indicates the enlargement of urban footprint replaces other land cover. Urban expansion in 2020, 2025 and 2030 will remove the green areas especially those adjacent to the existing urban boundary (Figure 7). Sungai Pulai and Sungai Skudai river basins having major transformation of land cover change they will receive significant impact spill of development from Johor Bahru city center. Between 2013 and 2020 there will a sharp increase of urban land in Sg. Pulai river basin from 24% to 35% and becomes dominant in 2030 with 44% coverage. On the other hand, vegetation areas will significantly decline in all river basins. Then, starting from 2020 onwards, built up areas become a major land cover in all river basins whereas the vegetation area will be reduced significantly in the future.

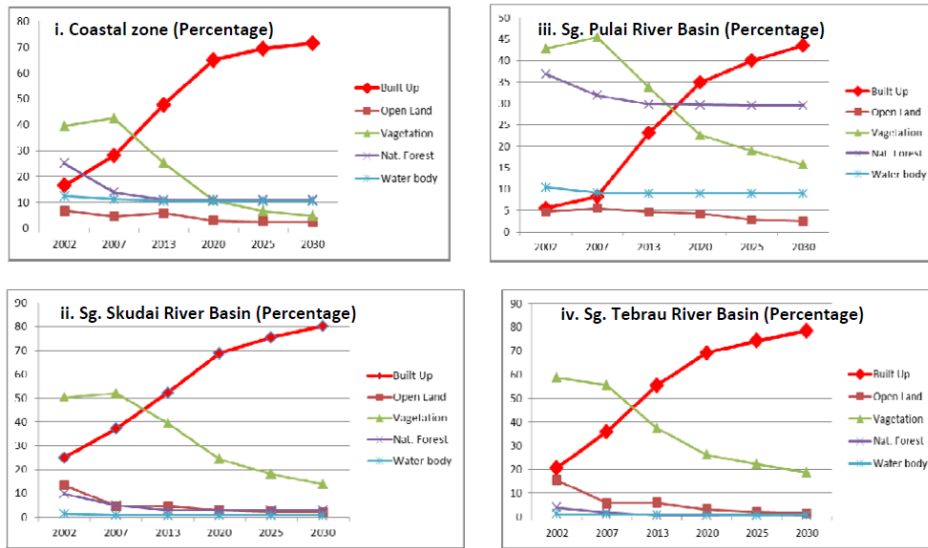


Figure 6: Percentage of landscape (PLAND) change in different river basin in Iskandar Malaysia.

In addition, it can be seen that the trend of future urban development is higher than past periods particularly in Sg. Pulai river basin and also significant compared to past trend (Figure 6 and Figure 7). As a consequence, the area within Sg Pulai river basin shows large agriculture area reducing for artificial development as stated in the development policy. This area will receive the expansion of development from Johor Bahru city centre besides the enlargement of Nusajaya development which merges the urban patches within the basin. The changes also include the expansion of residential and industrial lands in this region within all the river basins. On another perspective, all these land use activities could contribute to significant impact on some environmental issues.

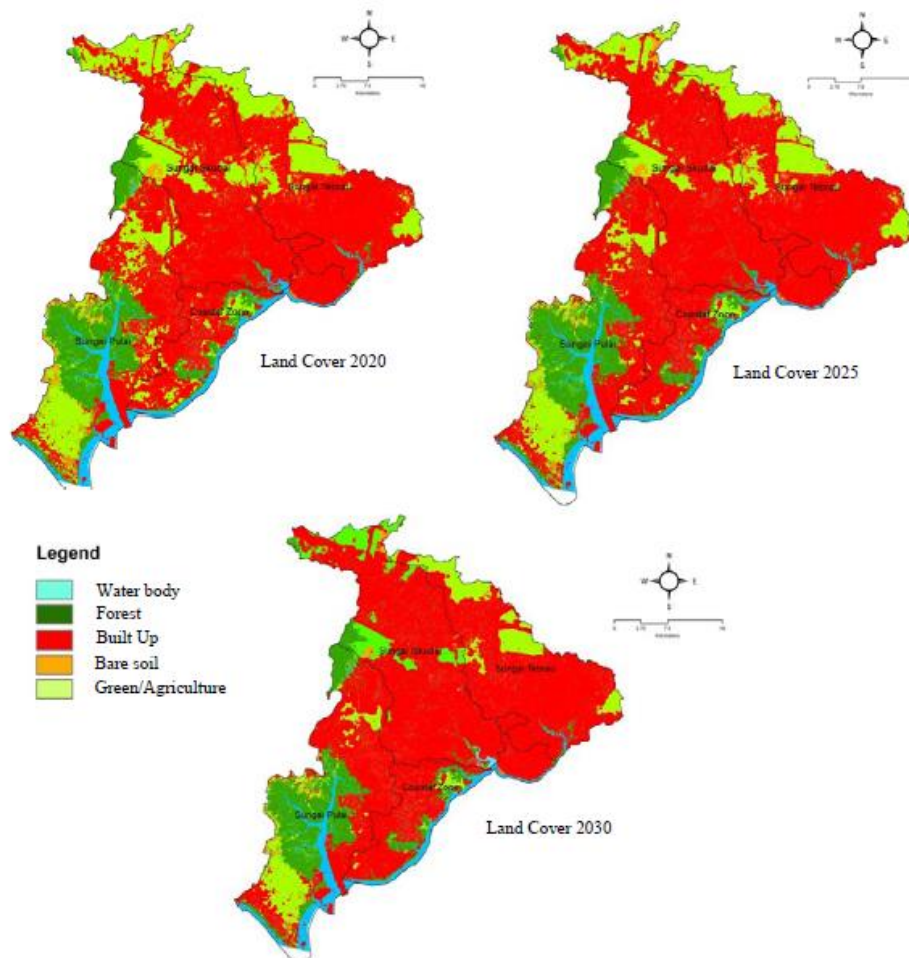


Figure 7: Spatiotemporal dimension of future land use and land cover change in the study area

The implication of the spatiotemporal changed contribute to the enlargement of urban footprint and starting to be dominant in the study area in the future. This concentration of urban development trend causes a huge degradation of other land covers such as agriculture land and natural areas. It changed the earth surface of the region which contributed to high disclosure towards environmental issues such as heat island, flash flood and pollution. Particularly in the river basins, the cumulative impact of large artificial surface would consequently increase the water run-off and non-point source pollution from land use activities. Besides that, as development progressed the large number of bare soil exposed for erosion contributing to the sedimentation of the rivers. This is a critical stage for many rivers in the study area which disturbed their aquatic ecosystems. Thus the landscape configuration and composition with the urbanization are important elements that influence the environmental condition in this study area.

Landscape configuration and composition characteristic

The spatiotemporal landscape changes significant transformation on the landscape composition and configuration in the past as well as in future development. In this study, urban landscape configuration and composition are evaluated to show the characteristics of spatial urban pattern changes in the study area with regard to development policy and environmental consequences. From past experience, the changes have restructured the landscape characteristic besides hugely removing green areas (natural and agriculture land). All development within 2002 and 2007 seems to enlarge the existing urban areas and show a small number of patches increased (Figure 8). It can be seen that the developments were allocated in the new areas as the number of patches (NP) increased in all river basin except for Sg. Skudai river basin. The percentage of urban land increased and NP reduced that shows the development has merged the urban patches through infill development. This situation is clear in Sg. Skudai river basin where past rapid development concentrated at the area surrounding Johor Bahru towards Pasir Gudang area where NP decreased from 2398 in 2002 to 1839 in 2013.

The trend was different in the following period where NP slowly decreased in 2013 in all areas except for Sg. Pulai river basin. The urban areas started to merge by removing other areas as percentage of urban area increased. However, the development in Sg. Pulai river basin with also outlying new patches indicates significant change in urban land distribution pattern between 2007 and 2013. The developments were big in this area particularly Nusajaya development and reflects to the concentration scattered development in this area. Overall, the expansion of urban landscape and pattern of development were complying with the development policy.

Future land projection shows that the agglomeration of the urban land constantly expanding their boundary and merging the urban patches. As a result, the NP will decrease tremendously in 2020 and then slowly reduce to 2025 and 2030 levels in all river basins (Figure 8). Overall pattern indicates that the urban land will enlarge their patches in the future and becomes major landscape in all river basins. The expansion will cross the boundary of watershed areas as well as their environmental impact.

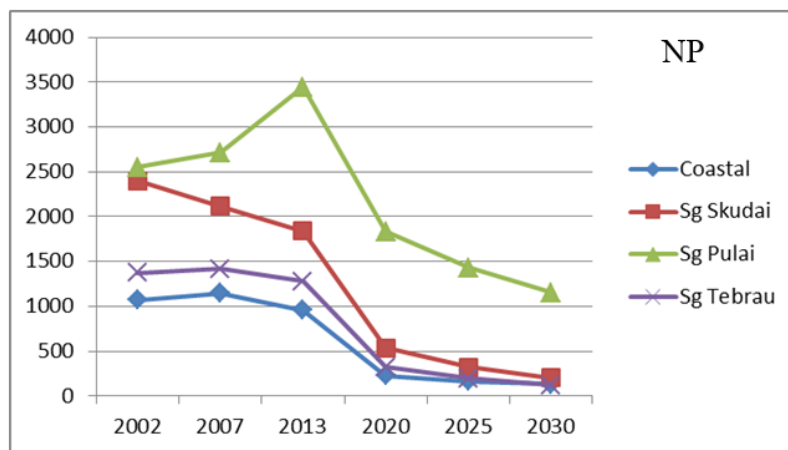


Figure 8: Number of patches for urban land changes

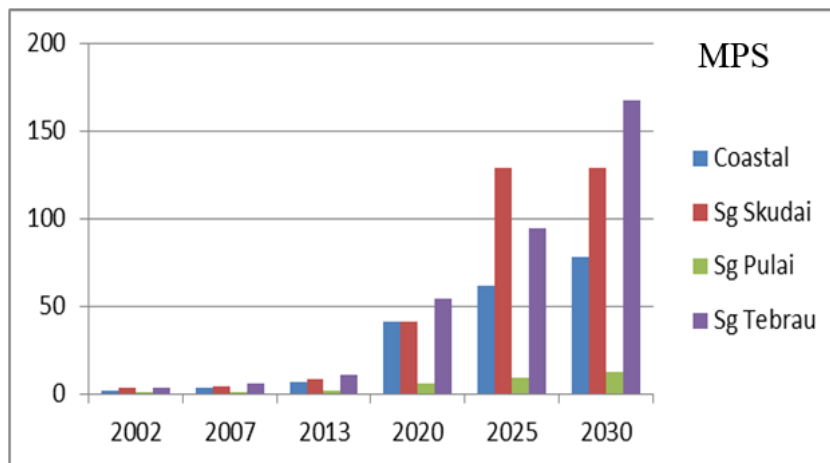


Figure 9: Mean patches size of urban land changes (hectare)

In relation to the spatiotemporal dimension of the study area, the increase of percentage and agglomeration of urban land point out the increase of mean patch size urban area (MPS). Overall development in the past shows the increase of urban patch size to be more significant in the future development in all river basins (Figure 9) were all urban area will merge and the NP will decrease. Nevertheless, the mean patch size of urban land in Sg. Tebrau and Sg. Skudai river basins shows substantial changes in the future. The changes will significantly change the spatial character in the entire landscape and consequently influence the environmental condition of the river basins. The increasing urban land with high concentration of development will change the microclimate and alter the hydrology system particularly water run-off in the river basins. It could contribute to heat island and flash flood when impervious surface increase besides pollution of the rivers. Those issues will be critical when urban land expand their boundary without concern to environmental impacts.

At landscape level, the diversity (SHDI) and evenness (SHEI) of overall landscape are important to evaluate the composition of the entire landscape in the study area. It is related to the distribution of different types of earth surface that influence the environmental condition of the study area. It is seen that the overall spatiotemporal landscape changes in the river basins show the diversity and evenness of landscape is decreasing over past periods and the future. However the diversity of land covers in Sg. Pulai and Coastal zone increased between 2002 and 2013 because it was a huge urban development that changed the existing landscape in this area (Figure 10). The changes also increased the evenness index and indicate that urban land has been distributed with equal complexity in those river basins (Figure 11). On the other hand, the developments contributed to the fragmentation of agriculture and natural land especially the wetland areas along the coastal zone. The concentration of development along the coastal area significantly changed the mangroves areas which has rich ecological value and services.

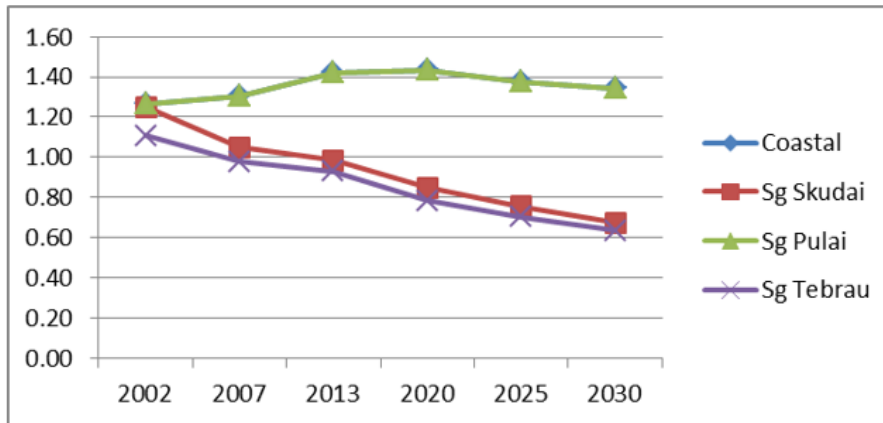


Figure 10: Diversity index (SHDI) of land cover in the river basins

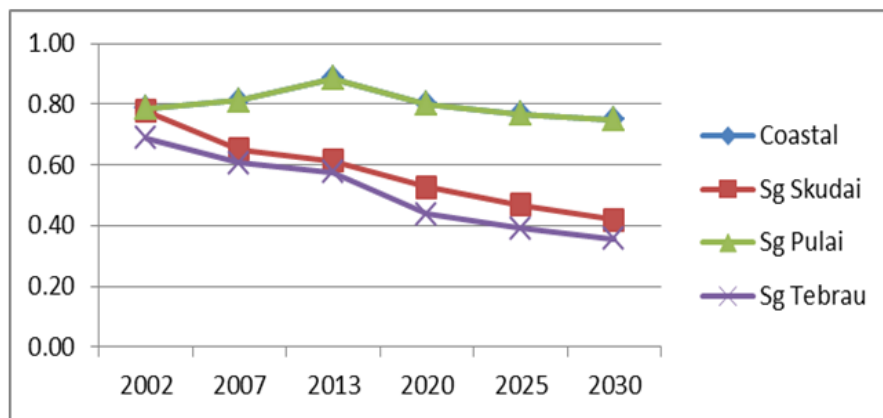


Figure 11: Evenness index (SHEI) of land cover in the river basins

Future changes show a declination of both indexes in all the river basins. This indicates that urban land will expand its area and remove other land covers and subsequently reduce the diversity and complexity of the other land covers. Overall the SHDI index shows the diversity of the land cover for all river basins almost in a similar pattern (Figure 10). However the diversity of the land cover is very significant in the coastal zone compared to the other river basins. It shows the composition of land cover component within coastal zone is diverse and its distribution is even compared to other areas. Meanwhile urban development in Sg. Tebrau and Sg. Skudai river basins hugely influence the diversity and evenness since the urban land cover significantly reduce the complexity of the spatial character in these areas. The implication for the diversity and evenness of the landscape condition reflects particularly on the environmental challenge of the river basins.

CONCLUSION

As a conclusion, the study has revealed the overall changes of the spatiotemporal LULC change and its character due to urbanization process. It observed significant changes of the spatial pattern over past periods and in the future. The measurement of the landscape pattern in different basins shows the implication of urbanization towards impacts on the environmental condition. The pressure on the environmental condition is very significant in all river basins and consequently could disturb the community within those areas. In a technical perspective, the integration of GIS and remote sensing in this study has contributed to the understanding of landscape pattern in those river basins. Detail characteristics of land cover give a clear indication on measuring spatial characteristic of landscape changes. Series of satellite images show the important temporal characteristics of LULC changes which can be related to policy evolution and environmental condition.

The spatiotemporal study is beneficial for decision-makers to evaluate the trade-off in their decision regarding spatial changes. This application allows decision-makers to predict future landscape configuration and composition in relation to environmental condition. Furthermore, the allocation of future land use should be evaluated thoroughly by considering all aspects and consequences. Such elements are crucial to maintain the quality of the entire landscape and conserving the environmental system in the region. This approach could improve management in land use planning and increase the capability of adaptive management.

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HUMAN BEHAVIOUR IN OPEN SPACE AROUND SPRING WATER IN A CENTRAL AREA OF MITO-CITY IN JAPAN

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Abstract

In this study, this study demonstrated a transition of surround environment and human behavior around each spring water. Firstly, 38 places of spring water remaining in Mito-city were investigated. As results, spring water was used as drinking water, washing water and fire water. Spring water close to farmland was used as water for agriculture. However, in recent years, although water quality was degraded, it could no longer be used as drinking water. Therefore, a park with hydrophilic water is recently building. Some water located around shrines was sacred place as a God of water and place for cleanse themselves. In addition, some spring water was used as a method of environmental education, prevention training and ponds for fish. From these findings, this study proposes multipurpose spring water use in future.

Keyword: Human behavior, hydrophilic water, spring water, Water front, Open space

INTRODUCTION

Spring water has been used in people's daily life water from the old days. In the spring space, culture of the region has been nurtured while having a close relationship with life. In addition, spring water plays a very large role, in order to maintain and conservation of animal and plant habitat. But amount of spring water has been reduced by the influence of recent urbanization. Relationship of life and spring water diminished by the spread of water supply facilities. As results, awareness of the presence of spring water has disappeared. Spring water is valuable as a cultural resources of the region and important as water of securing and firefighting water at the time of the disaster. In these circumstance, guidelines for spring water conservation and revival by the Ministry of the Environment in Japan in March 2010 has been issued. In recent years, there has been a growing movement toward conservation and revival of spring water. When previous papers were reviewed, there was few papers discussed spring water and human behavior.

In this study, the spring water areas that are currently also remaining in Mito city centers were investigated. Transformation process of exploitation,

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topography and utilization of spring water has been investigated. In addition, how to remake spring water in future was proposed.

OBJECTIVE AND METHODS

Firstly, spring water remained on 38 places in Mito city centers was found. Distribution of all 38 locations of spring areas, current present condition, type of topography, installation, and positional relationship between neighbor temples and shrines were investigated. Field survey of spring water was carried out in 2 to 30 December 2014. This study was assumed to be flowed out to the surface of the spring water in the natural state.

Next, some spring water, where installation was seen in setting scene among 38 spring water, were investigated. In these areas, hearing was practiced. Items about hearing research were constructed from current utilizations of spring water, changes in the spring of the surrounding environment up to the present, current development conditions and factors for these transformation. Participants in hearing were residents and people engaged in neighbor temples and shrines. Survey date was a total of 10 days of December 2014.

RESULTS INVESTIGATION INTO LOCATIONS, CONDITIONS< TOPOGRAPHIES AND CIRCUMSTANCES OF SPRINGS

Figure 1 shows spring water locations in a central area of the Japanese city of Mito. There are 5 areas in which spring water is concentrated. After comparing locations and topography, spring water appears to be more distributed along cliff lines, such as mountain slopes, cliff bottoms, and valleys. Table 1, shows the condition, topography, and circumstance of the spring water. Figure 2 shows types of topography. Type a) is a cliff-line type gushing from the cliff face of a plateau-terrace; type b) is a valley-head type gushing from valley terrain, such as a horseshoe, type c) is wetland or pond type groundwater seeping into the lowland. The examination results of all 38 locations show that 75% of the spring locations are of a cliff-line type, a), and that 25% are a valley-head type, b). Many springs are fragmentarily spread along the cliff line, and from a small valley distant from the cliff. The next survey checked whether or not there are installations at the springs. In this study, an installation is considered to be a space directing human behavior into a certain setting according to space planning. The results confirmed installations at 34% of the springs. Furthermore, these installations are currently accessible. There is a difference in height of installations. We also confirmed that 26% of springs neighbor temples and shrines. If springs are located close to temples and shrines, they are presumed to have some relationship.

Thus, springs are concentrated in five areas. Additionally, there is a tendency at some locations for spring water to flow into the ground. Table 1 shows different tendencies in present condition, types of topography, and

installations. Specially, it was predicted that there would be a close relationship between installations and neighboring shrines, and that daily use at shrines would contribute to the active use of spring water. Based on this analysis, it was predicted that 18 springs are connected to installations or shrines. The next sections analyze these 18 locations in detail.

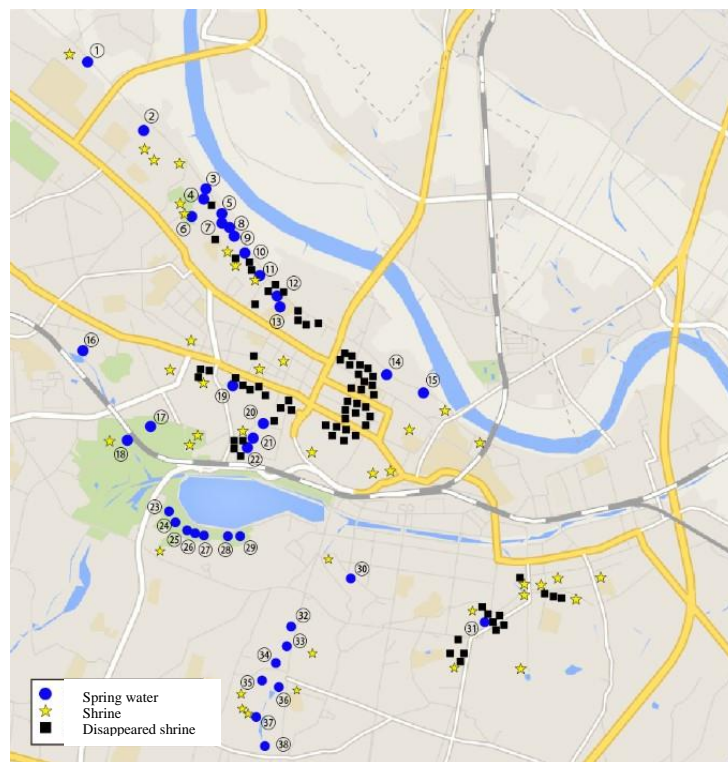


Figure 1: Spring water locations in a central area of Mito

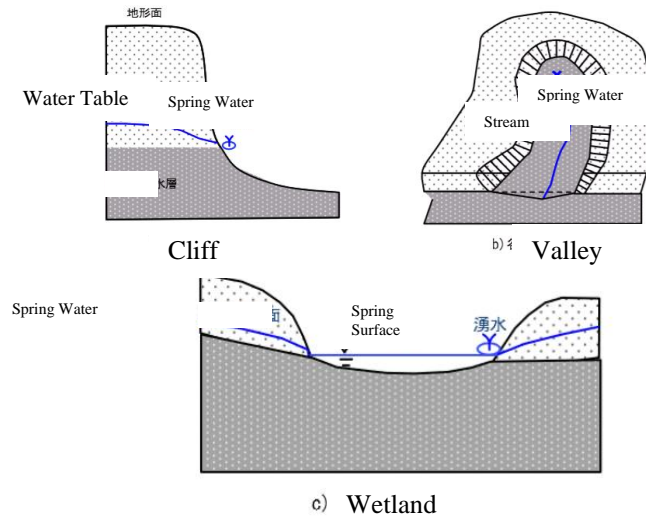


Figure 2: Types of topography

Table 1: Condition, topography, and circumstance of springs in a central area of Mito

No.	Area	Name	Present Condition	Type of Topography	Installation	Neighboring Shrine and Temple
1	North Horse Tableland	Surround Ibaraki University	Small Park	b)	-	present
2		Bakui	Park	b)	present	-
3		Youngyojo	Pond	b)	present	-
4		Musho	Park	b)	present	-
5		Ibaraki high school	Unusable	a)	-	-
6		Meisei	Large Park	b)	present	present
7		Kyudou	Small Park	a)	-	-
8		Nanamagari	Small Park	a)	present	-
9		Ochanomizu	Small Park	a)	present	-
10		Gion	Small Park	a)	-	-
11		Sinnyou	Small Park	a)	present	present
12		Taro	Small Park	a)	-	-
13		Sensinsen	Small Park	a)	-	-
14		Ozawa	Park	a)	present	-
15		Kensatu	Unusable	a)	-	-
16	South Horse Tableland	Sawawatari	Unusable	a)	-	-
17		Togyokusen	Park	a)	present	present
18		Gyokuryusen	Park	a)	present	present
19		Kodaira	Pond	b)	present	-
20		West Valley1	Unusable	b)	-	present
21		West Valley2	Unusable	b)	-	present
22		West Valley3	Unusable	b)	-	present
23	Senba Park	Senba Park1	Park	a)	-	-
24		Senba Park2	Park	a)	-	-
25		Senba Park3	Park	a)	-	-
26		Senba Park4	Park	a)	-	-
27		Senba Park5	Park	a)	-	-
28		Senba Park6	Park	a)	-	-
29		Senba Park7	Park	a)	-	-
30	Y Tableland	Mao koei	Unusable	a)	-	-
31		Yoshida Shrine	Pond	a)	present	present
32	Sakasa Green Park	Komon Bridge1	Park	a)	-	-
33		Komon Bridge2	Park	a)	-	-
34		Komon Bridge3	Park	a)	-	-
35		Komon Bridge4	Park	a)	-	-
36		Kashahara	Large Park	a)	present	present
37		Sakasa river	Unusable	a)	-	-
38		Shiohashi	Large Park	a)	present	-

RESULTS ABOUT TRANSFORMATION PROCESS

Results of all hearings, human action seen in spring space is as follows.

1. Life use is to utilize such as drinking water, washing vegetables and washing cloth.
2. Agricultural use is to utilize for irrigation of paddy and upland fields.
3. Subsistence use is to utilize for breeding fish and producing sake.
4. Hydrophilic use is to utilize for recreation, beautiful landscape and tourist destination.
5. Faith use is to utilize for mental cool down in temples and shrines and guardian god.
6. Educational use is to utilize for biotope and environmental education.
7. Disaster prevention use is to utilize for drinking water and fire-fighting water in a disaster and disaster prevention training.

The reasons why that is no longer used the spring water, were considered as reduction of spring water, changes in the vein, and the water quality deterioration.

Firstly, a transformation of exploitation in the spring water with installation have been described. As a result, the reduction of the amount of water due to urbanization, deterioration of water quality, the water spread, life use and agricultural use of the Edo era was decline. However, in recent years, as installation built by local authority and local community, many people spend a time as a hydrophilic use.

Then, a transformation of human behavior in spring water neighbor shrine and temple have been described. In this section, temples precincts and neighboring spring space were investigated. In spring water neighbor temples and shrines with installation, it had been used together with the temples and shrines. By ritual of celebration and worship is carried out over regular long period of time, the space would have become a base for the local community. And then, these facts had led to the implementation of a variety of spring water use.

Finally, the use of transformation and water spring with installation have been described.

Table 2: Human behavior in open space based on Installations around spring water

	Installation	Neighbor Shrine and Temple	Life use	Agricultural use	Hydrophilic use	Subsistence use	Faith use	Environmental Educational use	Disaster prevention use
2	Existence	-	Decline	Decline	Existence	-	-	-	-
4	Existence	-	Decline	Decline	Existence	-	-	-	-
8	Existence	-	Decline	Decline	Existence	-	-	-	-
9	Existence	-	Decline	Decline	Existence	-	-	-	-
14	Existence	-	Decline	Decline	Existence	-	-	-	-
38	Existence	-	Decline	Decline	Existence	-	-	-	-
3	Existence	-	-	-	-	Decline	-	-	-
19	Existence	-	-	-	-	Decline	-	-	-
6	Existence	Existence	-	-	Existence	-	Existence	-	-
11	Existence	Existence	Decline	Decline	Existence	-	Existence	-	-
17	Existence	Existence	Decline	-	Existence	-	Existence	Existence	-
18	Existence	Existence	Decline	-	Existence	-	Existence		-
31	Existence	Existence	Decline	-	Existence	-	Existence	-	-
36	Existence	Existence	Existence	-	Existence	-	Existence	Existence	Existence
1	-	Existence	Decline	Decline	-	-	-	-	-
20-22	-	Existence	Decline	-	Existence	-	-	-	-

In Table 2, human behavior in open space based on installations around spring water were shown. Life use and agricultural use has declined in many spring space, hydrophilic use was central amplified by applying installation. In some cases, local authority carried out installations in developing a park, local community build the installations by themselves. In that case, the spring water space has been recognized as a common property of the community. Installation is made at various levels, such as the development of local communities, park development of the city, the development of temples precincts. Spring space located in temples precincts neighborhood installation is has been multilateral use such as faith use, environmental educational use and disaster prevention use. In the central city, as spring water space without installation is not a beautiful natural landscape by the pollution of the water quality, management of the environment was needed such as cleaning the unwanted dust and unsanitary part.

CONCLUSION

Where residents have positioned as share of the property spring water, installation of the field has been constructed. In specially, centralization place of local community has been formed by the involvement of the spring water space in

everyday life. There is a difference in the transformation and nestled of exploitation by the function and history of spring water. Where spring water space is integrally utilized as a function of the temples, a special installation is performed. There, through the ritual of regular festivals and worship, it became a base for local communities. Spring water have been a wide variety available, such as life use, agricultural use, hydrophilic use, faith use, disaster prevention use and educational use, etc..

From the above findings, the local community and the local authority should develop the spring water space with installation and should make an involvement each other. At the same time, in order to encourage a diversified spring water use, and should be cross-promoted how to use that diversity. Specifically, to achieve the network by walking or events spring water. While achieving a hydrophilic use that can be round as a promenade, inheritance of faith and local culture, and should promote the complex use so that it can at the same time experience and environmental learning. In addition, the implementation of the initiatives utilizing the spring water in the disaster drill away. To learn the processing method necessary to use the spring as water for life. It is important to assemble a diversified use.

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MANGROVES DEGRADATION: A LOCAL PERSPECTIVE ON ITS AWARENESS

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Abstract

Mangroves in Malaysia reside on the coastlines, and the largest areas of mangrove are in the Northern Sabah. Over the past decades, mangrove species have been reported to be disappearing from the globe. It is due to several natural processes that have been inserted to fill the needs of the increased population. These include illegal logging, agriculture activities and urbanisation. In this regards, awareness of the local residents about the problem of mangrove depletion is important to inhibit the problem to prolong further. Therefore, this research was conducted to determine the degree of awareness of local residents on the importance of mangroves in managing environmental quality. Consequently, a questionnaire survey was conducted on 103 respondents to examine their awareness on the subject of mangrove degradation. The respondents were selected randomly among local residents of Kuala Selangor district. It is found that only twenty percent of the total number of respondents are totally aware of the issue and acted upon it; either taking part in the endeavours made by the government as well as those with the non-governmental bodies or practicing mangroves replanting at their backyard.

Keyword: Mangroves; Local Residents; Degradation; Awareness

INTRODUCTION

Mangroves has been long recognized as one of an efficient tool in managing the environmental quality. Its contribution is widely accepted in the sectors linked to social, economic and physical dimensions. It is a devastating situation where the natural environment is sacrificed in meeting the demands of 6.0 billion of people on the planet (Valeila *et al.*, 2009). Permanent Reserve Forest, cutting through the mangrove ecosystem is an asset to the state and contributed to the nations' economy, biodiversity, and the environment. Granting to the Food and Agriculture Organization (FAO) in 1980, mangrove forests are recorded to be 674,000 ha in Malaysia (FAO, 2007). Still, interpretations are changing in the succeeding ten years with a decreasing of 0.5 percent, with only 642,000 ha in 1990 (FAO, 2007). Eventually, the record of 2005, Malaysia has only 565,000 ha of mangrove woods, with decreasing 1.62 percent (FAO, 2007). Selangor has the highest total loss of mangrove area for the past two decades, from 1990-2010 (Refer table 1). Furthermore, according to Kamariah *et al.*, (2014), compared to the world's land-based forests, destruction of the mangrove ecosystem went four times faster

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and one-twenty percent of the world's mangrove was lost since 1980; at 35,500 square kilometres.

Table 1: The changes of mangrove areas in the last two decades

State	Mangrove area (ha) 1990	Mangrove area (ha) 2000	Mangrove area (ha) 2010	Mangrove loss (ha) 1990-2010	Mangrove loss (%) 1990-2010
Johor	29,797.13	25,477.19	23,6767.43	61020.70	20.54
Kedah	9,236.24	8,322.79	7841.25	1394.99	15.10
Pahang	11,467.03	10,791.42	9039.26	2427.77	21.17
Perak	52,562.00	46,057.00	43291.97	9270.03	17.64
Selangor	28,954.60	24,213.14	22530.20	6424.40	22.19
Total	132,017.00	114,861.54	106379.11	25637.89	19.42

Source: Hamdan et al., 2010 in FRIM, 2012.

Awareness of the residents determines the effectiveness of rehabilitation programs done by either the Government or the Non-Government organization. A good and successful environment management depends on the awareness that depicted perfectly in accommodating the issues and problem while rehabilitation programs are well implemented and enforced. Therefore, it is the argument of this research that there is not enough awareness in some of the residents, and the lack of this awareness is because poor participation in mangrove rehabilitation programs.

METHODOLOGY

Information collection included in this work includes primary and secondary information. Primary data gathered in this study are through a conducted face-to-face questionnaire survey. The queries included in the survey are open and closed questions mainly on the knowledge of mangrove awareness of the field. The respondents are limited (sampling size is 103) to the local residents of Kuala Selangor. The designed questionnaire is to measure the level of awareness regarding mangrove loss due to several activities ongoing in the mukim.

The questionnaire consists of three parts. The first part is the respondents' particular details. Part 2 is their general opinion on mangrove forest, and part three assesses their opinion on the mangrove degradation issue and awareness in Kuala Selangor

MANGROVE AND ITS ECOSYSTEM

Malaysia in one of the states ratified the RAMSAR convention in 1994. RAMSAR convention defined wetlands as areas of marsh, fen, peatland or water, whether natural or artificial, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters (Article 1.1 of the Convention) (Ramsar Convention Secretariat [RCC], 2013). According to Britannica Concise Encyclopedia, "Mangrove" is defined as any or certain shrubs and trees that belong to the families Rhizophoraceae, Acanthaceae, Lythraceae, Combretaceae, and Arecaceae (Palmae). It originates in the dense thickets or forest on the tidal estuaries, in salt marshes and on muddy coasts (Encyclopædia Britannica, Inc., 2015).

There has been an explosion of scientific research on mangrove biological and ecological aspects. Nevertheless, issues among local community restoration planning are limited (Davenport *et al.*, 2010 in Kamariah *et al.*, 2014). Rather, most studies concentrate on the statistics of Malaysia's mangrove protected area, mangrove ecosystem and its' biodiversity, management aspects, status and trends, values and depleting reasons such as Field (1998), Kamaruzaman *et. al.* (2008), FAO (2007), Macintosh *et. al.* (2002) and Kathiresan (2012).

In fact, awareness on this issue has been increasing recently and has led more efforts and actions in protecting the ecosystem. Either local authorities or international commitment organizations organize rehabilitation and restoration programs. Rehabilitation is an act of getting the ecosystem back into its original condition through many means (Field, 1996 in Macintosh *et. al.*, 2002). In restoring the system, there are numbers of action, which helps the ecosystem to heal.

“Community-based conservation” or CBC concept is apply to many conservation projects that relate to the significant characteristics of community participation, including community-based natural resource management, community-based social-ecological systems approaches, community-based conservation-protected area, incentive-based conservation and ecosystem management and others (Gruber, 2010 in Kamariah, 2014). Therefore, CBC is a conservation effort by and for communities, with active partners in protected area management (Kamariah *et. al.*, 2014).

FUNCTION OF MANGROVES

Humans in earlier history use mangroves as firewood, charcoal, timber poles and in fish trap construction (FAO, 2007). Mangroves are acknowledged for their “direct” and “indirect” functions (Choudhury, n.d). Direct functions of mangroves include as construction wood, board and rayon mills, in tanning industry, charcoal, timber poles and several edible products – i.e.; honey, fruits and meat (FRIM, 2012).

Indirectly, mangrove forests have the capacity to fight on the shock of the cyclone and tidal surges (FRIM, 2012).Mangrove forest is recognized to supply habitat for a diverse group of fauna. It is the spawning ground for fish and crustacean family. Mangrove forests also protect our coastlines from the tsunami, as they are the first nature belt of the coastal (FRIM, 2012; Iwan Tri Cahyo *et. al.*, 2006).

VALUES OF MANGROVES

Mangrove forest supports the economic activities (FRIM, 2012; Malaysia Timber Council [MTC], 2009), through nutrient recycling, water purification and flood control (FRIM, 2012). In assessing value of mangrove, it can then be divided into three values; the community, economic and ecological values.

Economic Value

Coastal areas are the centre of attraction for the tourist. Therefore, maintaining the coastal is necessary. Mangrove ecosystem is a natural buffer zone to the water system in coastal protection. Mangrove forest could reduce the erosion along the coastlines by barricading and slowing down the waves (FRIM, 2012). However, if the ecosystem is managed incorrectly, clearance of mangroves results in shoreline erosion. A chemical reaction occurs when acid sulphate soils are exposed to oxygen due to erosion and shallow of

estuaries, sulfuric acid may produce. In time, coastal erosion harms the economic activities as well.

In commercial fishing, the mangrove forest is recorded to contribute million Ringgit Malaysia to the nations' economy (FRIM, 2012; MTC, 2009). Perak has recorded the highest contribution to the country's economy through commercial fishing, charcoal, poles and shingles industries (Department of Fisheries, 2013) (Refer table 2). Economically, mangrove forest has taken commercial fishing to a new level.

Besides that, mangrove forest contributed to the charcoal and poles industry. In Malaysia, charcoal, shingles, and poles industry contributes significantly to the country's economy (MTC, 2009; FRIM, 2012). Different types of mangrove trees carry different characteristics. Thus, several mangroves usage are listed out accordingly (Refer table 3).

Table 2: Landing of marine fish by state in Peninsula Malaysia in year 2009

State	Fish Catches	
	Metric tons	Value (RM)
West Coast		
Perlis	178,247	805,640,168
Kedah	106,486	614,680,958
Pulau Pinang	42,790	254,041,412
Perak	258,086	1,155,477,524
Selangor	131,350	471,556,535
Negeri Sembilan	610	7,731,460
Melaka	1,691	18,054,463
West Johor	10,298	65,968,951
Total	729,558	3,393,151,472
East Coast		
Kelantan	58,891	238,679,360
Terengganu	84,319	445,703,808
Pahang	115,955	603,152,352
East Johor	77,316	324,453,770
Total	336,512	1,611,989,291
Peninsula Malaysia	1,066,069	5,005,140,762

Source: Department of Fisheries 2013, <http://www.dof.gov.my/en/fishery-statistics>

Table 3: Timber quality and uses of mangrove trees

Mangrove Species	Characteristics of the timber	Prevailing
<i>Avicennia spp.</i>	Hard and heavy wood, difficult to saw.	Rarely used for charcoal, Chip wood and panels, poor fuelwood.
<i>Bruguiera parviflora</i> <i>Rhizophora spp.</i>	Hard reddish wood. Heavy, dark red wood, silvery grain in radial cuts, fresh wood of short durability, needs long drying.	Pits prop, construction scaffoldings. Construction, rail ties panels; fishing rods, root system for spiritual carvings, fibers, fuelwood and charcoal production.
<i>Sonneratia alba</i>	Hardwood, resistant to shipworm that corrodes the plank.	Poor fuelwood, poles for houses, bridges, well, boats coppices for fences.

Source: Tomlinson, 1995 and MNS, 2010 in FRIM, 2012

Likewise, to the ceremonious use of mangrove tree, with the research and growth lead by FRIM, value-added mangrove products are produced; such as high quality indoor and outside furniture (FRIM, 2012). Furthermore, a sound business strategy could introduce timber products to higher values and in international markets.

Community Value

The broader community today has come to appreciate the mangrove ecosystem. In one occasion, visitors appreciate nature while enjoying the ecosystem in separate recreation activities. For instance, finding satisfaction in bird watching, bird lovers appreciate the mangroves for it attracts and support varied species of rare birds (FRIM, 2012). As mangroves provide the breeding ground for rare fish, recreational fishers highly rely upon the mangrove forest for leisure pursuits (FRIM, 2012). In addition, mud crabs and shrimps are normally set up in the region.

Students gain knowledge on the natural environment through mangrove forest as it backs up the planetary food chain. Furthermore, currently ecotourism and wildlife education are growing sectors calling many locals, the foreign tourist, schools and environmentalist (FRIM, 2012).

Ecological Value

Mangrove forests support a massive range of flora includes palms, shrubs and ferns (FRIM, 2012). In fact, these plants suit well with the ecosystem. The ecosystem, not only provides a breeding ground to many marine lives, it also contributed in sustaining fish and crustacean populations (FRIM, 2012). Besides that, the mangroves support the wildlife of crocodile, birds, tigers, deer, monkeys and honeybees.

Mangrove productivity is significant because it bears a direct impingement on the health and function of the marine food chain (FRIM, 2012). The concept of productivity mentioned is to depict the ecological value and part of the ecosystem. In general, high levels of productivity supports diverse animal within the ecosystem. Measuring the productivity level is hard and the results may not in absolute term. However, it is likely

to calculate its changes in certain elements of mangrove ecosystem that later used as a guide towards efficiency (FRIM, 2012). Furthermore, mangrove forest plays a vital role in shoreline protection, by reducing erosion and the impact of strong winds (FRIM, 2012; Kathiresan, 2012).

MANGROVES IN SELANGOR

Selangor has a large extent of mangrove forest (Refer figures 1 & 2). Selangor is situated in the west region of the peninsula and has about 90-kilometre length of coastlines from Sungai Bernam to Sungai Sepang in the south (Kamaruzaman *et. al.*, 2008). It is also surrounded by big islands along the coast (FRIM, 2012). According to Ong (1991), 60 per cent of the coastlines are covered with mangroves (Ong *et. al.*, 1991 in FRIM, 2012). The total area of mangrove forests in Selangor is 22,530.20 hectares; with the highest distribution in Klang with 16,630.87 hectares (Forestry Department Peninsular Malaysia, 2010 in FRIM, 2012) (Refer figure 2). Since 1962, mangrove forests in Selangor have been managed under a proper management-working plan for the production of poles industries and areas for conservation and protection (FRIM, 2012).

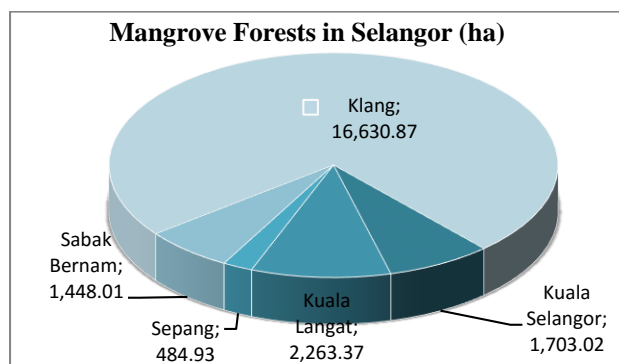


Figure 1: Mangrove forests in Selangor as of December, 2010
Source: FRIM, 2012.

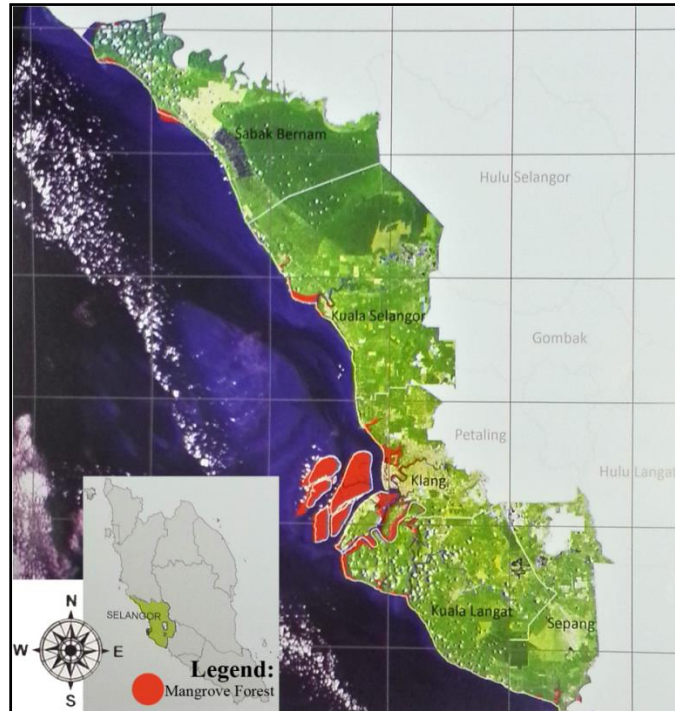


Figure 2: Distribution map of mangroves in Selangor by December 2012
 Source: Forestry department Selangor in FRIM, 2012.

STUDY AREA: KUALA SELANGOR, SELANGOR MALAYSIA

Kuala Selangor is located 64 kilometres north of Kuala Lumpur city centre. Kuala Selangor is bordered Klang and Petaling in the south, Gombak and Hulu Selangor district in the east and Sabak Bernam in the north (Refer figure 3). The overall area of Kuala Selangor is 119,452.46 hectares, which include nine mukims, which are; Kuala Selangor, Hujung Permatang, Pasangan, Ijok, Batang Berjuntai, Api-Api, Tanjong Karang, Jeram, and Hulu Tinggi (KSDC, 2014).

Kuala Selangor main development mission is to develop the district as an eco, agro and cultural heritage tourism based district in the state of Selangor (KSDC, 2014). Supporting this vision, the district council has formulated several objectives. Among the listed objectives, one related to mangrove forest is to maintain and preserve the ecology balance and sustainability of the natural environment with the protection of the Environmental Sensitive Area (ESA) in Kuala Selangor (KSDC, 2014).

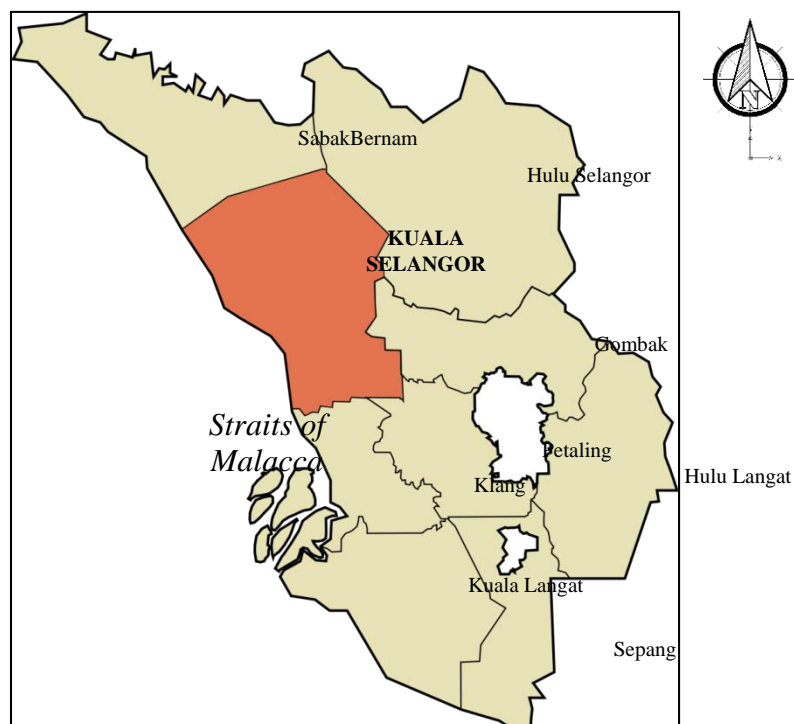


Figure 3: Map of districts in Selangor

Source: Amended from Kuala Selangor District Council, 2014.

<http://kualaselangor.selangor.gov.my/kualaselangor.php/pages/view/103>

FINDINGS OF STUDY

In the final section of the survey, respondents were asked several questions about their awareness on the issue of mangrove degradation, the reason of mangrove depletion, medium encounter the issue and the responsible body in managing with mangrove forest. The results show that 20 per cent that is totally aware perfectly of the issue; what happen, where did it took place and who is responsible in the matter (Refer table 4). Following to the number is the “Moderate Awareness” group with 36 respondents at 35 percentile. Wong (2006) says that the increasing level of awareness of the local community is the first step in empowering the local participation in planning and managing their natural resources. In the context of Kuala Selangor, it appears that there is potential future for better support to manage the mangrove regions.

Table 4: Awareness of the mangrove forest degradation issue in Kuala Selangor

Awareness	Frequency	Percent	Cumulative percent
Totally Aware	20	20	20
Moderate Awareness	36	35	55
Weak Awareness	23	22	77
Not Aware	24	23	100
Total	103	100	-

The next question asked to the respondents is; from what media or medium they encounter this issue. This is an open answer question where the respondent is to choose more than one choice of the given option. This has resulted in 51 respondents choosing the option “Television” and 49 respondents choose “Newspapers” (Refer table 5) and thus carry 23.8 per cent and 22.9 per cent respectively.

Table 5: Medium respondent encounter the issue of mangrove degradation from

		Responses	
		Number	Percent
Medium	Radio	6	2.8%
	Newspaper	49	22.9%
	Television	51	23.8%
	Journal	15	7.0%
	Friends	34	15.9%
	Internet	36	16.8%
	Institution	16	7.5%
	Authority	7	3.3%
Total		214	100.0%

Subsequently, they were asked in their opinion on the reasons of mangrove degradation in Kuala Selangor. Most respondents pick “Illegal Logging” as the main factor with 30.4 per cent, while “Urbanization process” is the second reason with 23.7 percentile (Refer table 6). However, a dissimilar result was seen from the reasons listed out by Forest Research Institute Malaysia. The reasons as listed out by FRIM include urbanization, aquaculture, agriculture and coastal erosion; as supported in their research.

Table 6: Reasons of mangrove degradation on the respondents’ opinion

		Responses	
		Number	Percent
Reason of Degradation	Urbanization	46	23.7
	Aquaculture	36	18.6
	Agriculture	10	5.2
	Water Pollution	43	22.2
	Illegal Logging	59	30.4
Total		194	100.0

Next question, respondents are asked about the importance of spreading the news of mangrove degradation to all Kuala Selangor residents or not. More than 100 respondents agreed; that educating Kuala Selangor residents are vital towards better understanding the mangrove loss issue. That is 99 percent to 59.2 chooses “Very Important” and 39.8 percent chooses “Important” (Refer figure 4).

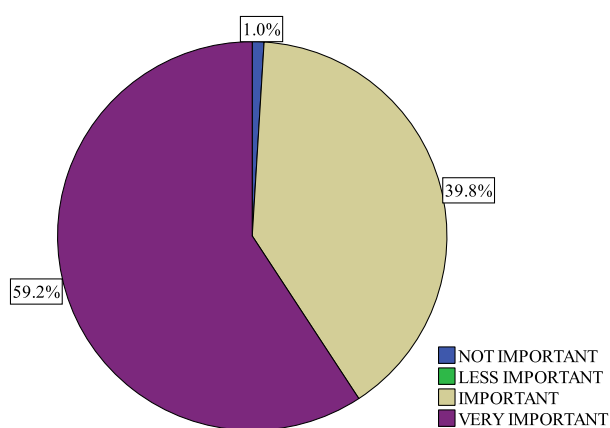


Figure 4: The importance in educating people of Kuala Selangor towards the issue of mangrove depletion

The final question of the survey questioned their choice of who are responsible towards the environment. The options given are among the Government, Non-Governmental Organizations, and the public. Out of those options, the most picked option is the Government with 38.5 percentile, followed by the Public with 36.3 percentile (Refer table 7). A sum of 33 respondents is recorded to select all three agencies as they consider that it is the responsibility of all residents of the country to protect the surroundings. This finding conforms to the view of Irini *et. al.* (2012) in which they mention about several roles of NGOs in mangrove conservation.

Table 7: Responsible bodies in taking care of the mangrove forest

Responsible	Responses	
	Number	Percent
Public	66	36.3
Government	70	38.5
Non-Government	46	25.3
Total	182	100.0

CONCLUSION

Throughout the study, it has been argued that the awareness level of the local community towards mangrove depletion is still low, yet we are losing mangrove forests at 22 percent for the last two decades. This has been confirmed by FRIM, through their research saying that Selangor has the highest total loss of mangrove area for the past two decades, from 1990-2010. Thus, public understanding and awareness in regards of the mangrove biological and economy values are vital in ensuring the proper management of this resource. The findings of the research indicate the potential of future actions which the local residents can participate in managing their local mangrove habitat. The collaboration of many stakeholders in policy making for a better and effective mangrove management is called for either at the local level or state level. All stakeholders responsible for managing mangroves should play their roles efficiently to ensure that the valuable mangroves are well protected for the sake of future generations.

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IDENTIFY SIGNIFICANT INDICATORS FOR A HAPPY CITY

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Abstract

Although, happiness has been evaluated by many researchers, there are very limited studies on happy environment, specifically happy cities. In addition, different methods that have been introduced for measuring happiness by previous studies have several major shortcomings. Firstly, happiness is considered equivalent to satisfaction or the quality of life. Secondly, the majority of these methods are not easy to follow and it is difficult to connect them to design process. Furthermore, these methods support only a limited number of indicators and majority of them are not related to the happy environment. Thus, this paper reviews prominent studies on happiness evaluations and happy environment to identify effective indicators for happy cities. It also attempts to highlight current happiness evaluation methods that consider happy environment to determine how various studies assess cities for happiness. The weaknesses and strengths of different evaluation methods are discussed in this paper to propose a better way to assess happy cities. A systematic review is used to identify indicators for happy cities. Overall, socio-economic factors, environmental factors (e.g., air pollution and temperature), geographical location and facilities management are effective variables for happy cities. This study discusses the challenges in happiness evaluation and attempts to introduce new objectives for futures studies. The results of this study can be used to propose strategies to have happier cities.

Keyword: Happiness; Happy city; Happy environment; Measuring happiness

INTRODUCTION

Nowadays people who are living in urban areas suffer from stress and depression because of their motorized lifestyle (Bókony et al., 2012; Peig and Green, 2010). Although happiness can decrease this stress and stress-related diseases (Shochat et al., 2007; Å-Ralf et al., 2007), people who are living in urban areas are not as happy as people who are living close to nature. Lack of happiness has negative effects on the quality of life (Mercer, 2012; Ballas, 2013). In addition to the birth or genetics, marital status and earnings, environmental factors such as air quality, green space, temperature, wind speed and ambient noise level also can affect happiness level (Peig and Green, 2010; Å-Ralf et al., 2007; Jordison and Kieran, 2003). Therefore, paying attention to the environmental factors in urban areas can affect happiness and quality of life.

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Dense urban living has been prescribed as a solution for sprawl negative externalities such as environmental and resources crisis. However, this solution changes the society rapidly and affects lifestyle and the quality of life (Huang et al., 2013). If enough attentions would not been paid to the lifestyle changes, the resulted lifestyle can decrease happiness and increase stress and pressure (Mecer, 2012). Therefore, one of the problems in our cities can be lack of happiness feeling while people experience more stress and pressure and this issue can affect the quality of life (Bókony et al., 2012).

Researchers use various models for measuring the happiness (Savageau, 2007; Ballas, 2013). For instance, some studies measure the happiness using the effective factors for quality of life (Marans and Stimson, 2011). Well-being is also one of the important factors that represents happiness in many studies (e.g., Gowdy, 2005; Dolan et al., 2008; Welsch, 2009). Satisfaction (e.g. Mackerron and Mourato, 2009; Menz and Walsch, 2010) and pleasure (e.g. Maddison and Rehdanz, 2010; Raphael et al., 2001) also represent happiness in various studies. The living environment can affect all of these factors that are used to measure happiness. Therefore, there is a possible relationship between living environment and happiness (Ballas & Dorling, 2013).

There are some studies that consider the relationship between happiness and environment (Marshall et al., 2014). These limited studies (e.g., Susana Ferreira et al., 2010; Tobias Menz, 2011) focused on the relationship between macro-level factors such as air pollution, economic and life satisfaction at country level (Ballas & Dorling, 2013; Welsch, 2009; Ballas & Dorling, 2007). Therefore, this study tries to focus on city level that has not been investigated.

METHOD

Happiness can be affected by everything that people need such as income, health, recreational activities and etc (Dolan et al., 2008). M.Farouk Radwan (2014) believes that happiness is the feeling that you experience when you realize that everything is exactly as should be. Happiness comes from everything around you that can give satisfaction or pleasure feeling to you (Susana Ferreira et al., 2010). Cities that are living places for lots of people contain everything around people's life. Therefore, cities can affect people's happiness.

There are various measurements for happiness in different studies. These measurements include satisfaction (e.g. Mackerron and Mourato, 2009; Menz and Welsch, 2011), quality of life (Marans and Stimson, 2011), well-being (e.g., Gowdy, 2005; Dolan et al., 2008; Welsch, 2009), and pleasure (e.g. Maddison and Rehdanz, 2010; Raphael et al., 2001). In addition, there are some indicators in the cities that can affect satisfaction, quality of life, well-being and pleasure. Therefore, happy city factors can be achieved by considering the relationship between happiness measurements and city indicators. The happy city factors and their effects are evaluated in this study by reviewing existing limited studies about happiness and urban life. This paper tries to review the majority of the studies that considered at least one of the happiness measurements and urban structures indicators.

Although age, gender and race in addition to the socio-economic factors such as income and cultural differences can affect happiness, the current study considers just urban structure indicators regardless of the individual characteristics. Therefore, this study focuses on urban structure indicators that are the same in various socio-economic

contexts. Therefore, the results can be used for various cities around the world. This study also considers happy city factors that can be defined by measurable factors and the influence of non-measurable indicators (e.g., sense of belonging) is not considered.

RESULTS

Economic is one of the factors that have considerable effects on happiness level and well-being (Welsch and Kühling, 2009). Various studies have focused on subjective well-being because they can measure and compare well-being between people. Hereby, they achieved their desired information by asking people. In addition, they fitted econometric models to their respondents and assess some of happiness factors empirically.

Dolan et al. (2008) determined factors that have positive or negative correlations with well-being. The positive factors include environmental condition (e.g. green space, blue space, attractive land cover and etc), high income, ambition and social capital indicators (e.g., trust, membership of friendly relations or interest groups and belief in a god). The negative factors include environmental problems (e.g. air pollution, noise pollution, water pollution and etc), higher incomes for others, unemployment, higher past income and negative relationship indicators (such as separation and divorce). In addition, economists found a new way to measure happiness by the influence of environmental factors on well-being and monetary terms (Welsch, 2009). Welsch (2006) found links between environment and income through computing the cost of air pollution (e.g., healthcare and material repairing costs). Lower cost means more monetary benefits and being happier. The positive and negative environmental factors that are mentioned in these studies can be used as parts of our proposed happy city indicators.

The landscape is one of the environmental factors that can affect happiness by creating evolutionary kind of feeling (Searns, 1995; Milligan et al., 2004). Hartig et al. (2010) focused on the living environment around people that can shape the human mind. This study mentioned that the nature of human always depends on the nature. Therefore, attractive landscape can create pleasure and happiness feeling that has positive effects on mind. Various studies have tried to prove that nature improve emotional needs such as happiness (Wilson, 1993; Katsui and Ghotbi, 2005). In addition to the positive effects of natural environments on emotion and happiness, they also act as restoration of psychological (Wilson, 1993; Aks & Spratt, 1996; Katsui and Ghotbi, 2005; Hartig et al., 2010). The natural environments (e.g., landscape, forest, savanna and mountains) should be reachable in the environment around human habitat. Diener et al. (2009) and Moro et al. (2008) found that people (based on the subjective well-being) who are living proximity to the coastline are happier. Ferreira & Moro (2010) mentioned that coastline is not significant factor for happiness if the distance is more than 5 km.

Paying attention to the natural forms for landscape is important since natural habitats have curve, regular and irregular geometric shapes that lead to increase aesthetic, positive emotion and pleasure (Aks & Spratt, 1996; Jordison and Kieran 2003). The natural capital is one of environmental factors in various studies that has positive relationship with happiness indicators at country level (Engelbrecht, 2009; Vemuri and Costanza 2006; Engelbrecht 2009). This factor also can be used at the city level.

Frijters and Praag (1998) investigated on the weather's factors and influences on the subjective well-being (SWB) in Russia. They focused on temperature between 18.3 Co and 28 Co, precipitation, wind speed, rainy days and hours of sunshine. They found

that these factors can affect SWB. For instance, the temperature more than 28 Co or less than 18.3 Co has negative effect on SWB. Rehdanz and Maddison (2005) also examined climate variables and focused on variations in temperature and months (e.g., lower temperature at warm months and higher temperature at cool months). They found that SWB is related to mean temperature variations. Similarly, Maddison and Rehdanz (2010) focused on temperature and determined ideal temperature using data in country level (87 countries). The proposed ideal temperature is between 18.3 Co and 28 Co. The effects of precipitation, wind speed, rainy days and hours of sunshine on SWB can be different based on the study area. For instance, wind has negative effect on SWB in Ireland (Moro et al., 2008; Ferreira and Moro, 2010).

Welsch (2002; 2003; 2006; 2007) found a negative relationship between SWB and air pollution factors at country level. Menz and Welsch (2010) also introduced the negative effects of air pollution on the health that decrease SWB using data from 25 countries. They mentioned that if the concentration of air pollution is more than PM10, it can lead to health problems and decrease SWB. Similarly, Rehdanz and Maddison (2005, 2008) found a relationship between SWB and perceived of participants regarding air pollution level (higher perceived pollution level, lower SWB). There are considerable studies regarding the negative effects of air pollution on SWB and happiness at country level (e.g., Ferreira and Moro, 2010; MacKerron and Mourato, 2009; Levinson, 2009). This factor also can be used at the city level.

Water pollution also can affect SWB and happiness. Part of the water pollution can be related to air pollution but the main reasons are organic pollutants (e.g., severely polluted sources that are located near the rivers). Water pollution can increase people worries regarding drinking water in their house, health problems and losing natural resources such as green and open space. Therefore, water pollution is another environmental factors that have direct negative effect on individuals' well-being, life satisfaction and happiness (Israel and Levinson, 2003; Ferreira and Moro, 2010). Van Praag and Baarsma (2005) focused on noise pollution and examined aircraft noise near airport in Amsterdam. They found a negative correlation between noise pollution and SWB. Weinhold (2008) investigated the effect of perceived noise pollution on SWB using individual data in Europe (e.g., the sound of aircraft when they slept). This study also found a strong negative relationship. Table 1 summarizes the effective factors regarding happiness and built environment that are mentioned by previous studies. This table also shows the relationship between built environment factors and happiness. These factors can be used to define happy city indicators.

ENVIRONMENTAL HEALTH INDICATORS

Indicators are measurements selected to represent a large phenomenon of interest. An indicator points to certain issue or certain condition in certain city. It provides useful information for decision makers, not just data (Peterson et al., 1999), and can generate discussion among people with different backgrounds and viewpoints (Andrew, 1998).

Environmental indicators evolved during the 1970s when the environment became a mainstream issue and governments responded with environmental assessment legislation and processes. In the 1980s, two approaches arrived, which were sustainable development and healthy communities. Sustainable development indicators are now commonly used at the national, regional and local levels in many nations. The healthy

community model continues to frame analysis, although it seems to have been eclipsed since the late 1990s by the quality of life model (Seasons, 2005). In the past 20 years, some of the most interesting theoretical advances in broad-based indicator development have been the promotion of a capabilities approach; the synthesis of economic, quality of life and environmental indicators under the banner of sustainability; and experimentation with participatory methodologies (Keough, 2005).

Besides the broad-based sustainable indicators and quality of life indicators, there are also more specified or focused indicators which have been developed and used for the issues of environmental health, such as Environmental Health Indicator by WHO, the adaptation by WHO-Europe and New Zealand, and the Environmental Public Health Indicators by Atlanta.

In this study, preliminary set of environmental health indicators was developed for the aspect of urban air. It includes two major components which are air quality indicators and air-related health indicators. In selecting and proposing environmental health indicators, the following points were taken into consideration:

Table 1: Summary of significant environment factors that influence on happiness

	Air pollution	Noise pollution	Water pollution	Min & Max temperature	Wind speed	Rainy	Sunny	Landscape	Natural habitats	Natural capital	Coastline
Aks & Sprott, (1996)									+		
Brereton et al. (2008)											+
Engelbrecht (2009)										+	
Ferreira and moro (2010)	-		-	-,+	-,+	-,+	-,+				+
Frijters and Praag (1998)				-,+							
Hartig et al. (2010)			-					+			
Israel and Levinson, 2003											
Juricevic et al (2010)									+		
Katsui and Ghotbi (2012)									+		
Levinson (2009)	-										
Mackerron and Mourato (2009)	-										

Maddison and Rehdanz (2010)				-,+							
Menz and Welsch (2010)	-										
Moro et al. (2008)				-,+		-,+	-,+				+
Rehdanz and Maddison (2005)				-,+							
Rehdanz and Maddison (2008)	-			-,+							
Ulrich et al., 1991										+	
Praag and Baarsma (2005)		-									
Vemuri and Costanza, (2006)										+	
Weinhold (2008)		-									
Welsch (2002)	-										
Welsch (2003)	-										
Welsch (2006)	-										
Welsch (2007).	-										
Wilson (1993)									+		

Note:

(-) negative effects on happiness

(+) positive effects on happiness

CONCLUSION

Increase urbanization and motorized lifestyle lead to various negative externalities such as inactive lifestyle, traffic congestions, air pollution, more fuel consumption, noise pollution and health problem. These negative externalities can reduce happiness in our living environment. Nowadays, living environments especially in developing countries are not happy environments. There are limited studies regarding happy environment especially at city level. Therefore, this study focuses on the happy cities and tries to find happy city factors by reviewing current literature. The results show that although socio-economic factors affect happiness significantly, environmental factors such as air quality, climate, noise and access to green spaces also can affect happiness.

Based on previous studies, there are different evidences from observational and experimental sources that showing some environmental factors have positive correlation

with SWB and happiness (e.g., landscape, natural habitats and capital, coastline, temperature between 18.3 co and 28 co) while the effects of some of them such as wind speed, rainy or sunny days are highly depend on the weather conditions in the region. There are also some environmental factors such as air pollution, noise pollution, water pollution and temperature less than 18.3 co and more than 28 co that have negative correlation with SBW and happiness.

Because happiness is an essential need, appropriate conditions in the cities can increase happiness. However, previous studies did not consider cities opportunities to increase happiness. The current study attempts to make up for this shortcoming by introducing some factors for happy cities. These indicators were extracted from limited existing literature. The value of this research is in providing a foundation to develop happy city studies that were not addressed previously.

Although this study tries to cover majority of limited studies regarding built environment and happiness, further studies can introduce more factors for happy city by considering more studies and including experts and people opinions. Further studies also can prioritize the happy city factors based on the strength of their relationship with happiness. A model to evaluate and rate cities for happiness also can be proposed by further studies. This model can be developed based on the relationships between happy city factors and happiness. The final step for further studies can be suggesting improvements to have happier cities based on the failures that are identified by their proposed model.

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A DISCRETE CHOICE MODEL FOR FIRM LOCATION DECISION

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Abstract

Where to locate? It is one of the most important question in locating a business in a city. In the city center, business or firms are functioning as a dominant attractor of employment and also employment locations which linked the land use and transportation system. The objective of this paper is to describe the location model of firms in Kuala Lumpur area. Two important determinants of location choice model in this study are the accessibility measures and the suitability analysis indicators. The model focuses on the statistical technique for analyzing discrete choice data by using econometric and Geographic Information System software. The findings in this paper show that agriculture, mining, electricity, gas and water, transport and finance firms' type are mostly located outside of Kuala Lumpur's Central Business District area. Meanwhile, manufacturing, construction and wholesale firms' type are located in the Central Business District area. The result of this study will highlight the use of discrete choice models in the analysis of firm location decisions which will be a foundation to facilitate town planners and decision makers to understand the firm location decisions in their region.

Keyword: Discrete Choice Modeling, Central Business District, Firm Location Decision

INTRODUCTION

Many factors influence the location of firms or businesses. Leitham *et al* (2000) among others identified business characteristics, the locality and the type of production. Other scholars suggested that firm location choice is based on (i) labour cost and quality; (ii) market and transportation access; (iii) interests of the pro-business community (Dipasqualea and Wheaton, 1996); (iv) economies of scale and (v) the economies of agglomeration (Li, 2007). Although these are not the only factors that influence the location choice, the importance of these factors varies by business sector and city.

Locating firms in the Central Business District (CBD) are important, especially in a capital city. The CBD is an area that is relatively easy to access and convenient for workers and customers/clients because of its function as a hub for all major modes of private and public transportation. The CBD area also has access to a full range of public amenities which includes services, shops, restaurants and entertainment.

For this study, the urban economy of two distinct locations was considered. The two locations are Kuala Lumpur Central Business District area and the rest of Kuala Lumpur which is its metropolitan area. The model which considers 2 locations is denoted by $j=0, 1$. In the study period, 1990-2007, the entry and exit of firms was examined. We

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can observe the growth and survival of a firm within the process. A firm might choose to locate in the city center where transportation cost is minimized but rents are high. Alternatively a firm also might choose to locate away from the city center where rents might be slightly lower but the transportation costs could be high. This research will give an account of discrete choice analysis of firm location decision for the Kuala Lumpur area.

DISCRETE CHOICE ANALYSIS

A discrete choice model is an econometric model in which the actors are presumed to have made a choice from a discrete set (Parson, 2004). Their decision is modelled as endogenous. Discrete Choice Analysis is used as a group of statistical techniques to model the way in which people choose between different alternatives, such as a transportation mode. The basic concept used is that each alternative has a total utility to the decision-maker, which is the combination of the weighted utilities of all the attributes of the desired option; for example, if a university, then the quality of the university teachers, the course content, the entry requirements, distance from home, and local living costs.

It is then possible to calculate the possibility, P , of choosing one out of j alternatives on the basis of the equation:

$$P = \frac{v_i}{\sum_j v_j} \quad (\text{Equation 1})$$

where,

i is the rank, by utility, of the alternative and
 v_i its utility, but the amount of data and calculation entailed is enormous.

The easiest and most widely used discrete choice model is logit because of its formula for the choice probability takes a closed form and is readily interpretable (Train, 2003). Logit model is used to model the relationship between a dependency variable Y and one or more independent variables X . The dependence variable Y is a discrete variable that represents a choice from a set of mutually exclusive choices. The independent variables are presumed to affect the choice and represent a *priori* belief about the causal or associative elements important in the choice or classification process.

This model focuses on the statistical techniques for analyzing discrete choice data using econometric software NLOGIT version 4.0 (Greene, 2008) and STATA software.

Model Formulation

Random Utility model

For the starting point for model development, consider a firm random utility derived over a single choice situation, whether to choose a location. The two outcomes are 'locate inside the CBD' and 'locate outside the CBD'. The random utility model is simply as follows:

$$U(\text{outside CBD}) = \beta_0 'x_0 + \varepsilon_0$$

$$U(\text{inside CBD}) = \beta_1 'x_1 + \varepsilon_1$$

By assuming that ε_0 and ε_1 are random, the probability that the analyst will observe a location is

$$\begin{aligned} \text{Prob (inside CBD)} &= \text{Prob (U (inside CBD) > U(outside CBD))} \\ &= \text{Prob } (\beta_1 'x_1 + \varepsilon_1 > \beta_0 'x_0 + \varepsilon_0) \\ &= \text{Prob } (\varepsilon_1 - \varepsilon_0 < \beta_1 'x_1 - \beta_0 'x_0) \\ &= F(\beta_1 'x_1 - \beta_0 'x_0) \end{aligned}$$

Where $F(z)$ is the Cumulative Density Function (cdf) of the random variable $\varepsilon_1 - \varepsilon_0$

Binary choice model

A Case Study

For this study, the universal choice consists of 9 types of firms. Although in the previous chapter it was 10 types of firms, because the first category represented 'undefined firms' it was dropped from this analysis. An aim of this model is to associate the firm location with its type, suitability and accessibility.

Data Setup

The data used for this analysis consist of the firm location choices of a sample of 55071 individual firms in Kuala Lumpur area not including the firm data with which haven't been classified. Table 1 shows the firm data entry between the years 1990 and 2007 in Kuala Lumpur area.

Table 1: Firms entry by year exclude dormant firms

Year	Firms
1990	2401
1991	2616
1992	2637
1993	3548
1994	4099
1995	4163
1996	3968
1997	3261
1998	1696
1999	2453
2000	3038
2001	2740
2002	3095
2003	3413
2004	3459
2005	3288
2006	2947
2007	2249
Total	55071

Source: Company Commission Malaysia, 2009

Description of the data

For the data analysis, the data set consists total of 55071 firms, in two locations which are in the CBD and outside of the CBD. Included in the data is the information on firms type which has been categorized by 9 sectors.

Original Data

The list of the original variables in the model is as follows:

Location	= 0/1 for two alternatives (1 = inside CBD, 0 = outside CBD)
Type	= 9 types of firm
	T1 - Agriculture, Forestry, Livestock and Fishing
	T2 - Mining and Quarrying
	T3 - Manufacturing
	T4 - Electricity, Gas and Water
	T5 - Construction
	T6 - Wholesale and retail trade, Restaurant and hotel
	T7 - Transport, storage and communication
	T8 - Finance, insurance, real estate and business services
	T9 - Community, social and personal services

For the transformed variable, we use dummy coding and effect coding. The use of dummy coding, which is also known as an indicator variable in logistic regression, is as a variable that can take two values only, typically the values 0 or 1 to indicate the absence or presence of a characteristic. Meanwhile, effect coding provides one way of using categorical predictor variables in various kinds of estimation models, such as linear regression. Effect coding uses only ones, zeros and minus ones to convey all of the necessary information on group relationship.

For example, for every four levels of attributes, three indicator variables were constructed. The first level coded as (1,0,0) which is associated with the first attribute level. The second level indicator, coded as (0,1,0) which is associated with the second attribute level. The third level is coded as (0,0,1) which is associated with the third attribute level. The fourth attribute level is coded (-1,-1,-1) on these three indicator variables. Transformed variables for this model consist of dependent variables which are the firm location and independent variables which are the firm type, accessibility measure and suitability indicator.

Transformed Data

The transformed data categorizes as dependent variables and independent variables. The firm location variables are set as the dependent variables and the firm type, accessibility measure and suitability indicator are used as the independent variables. The details are as follows:

A - Dependent variables

Variable	Code	Description	Level	Dummy coding
Firm Location	IN	Inside CBD	1	1
	OUT	Outside CBD	2	0

B- Independent variables

i) Firm Type

Variable	Code	Description	Level								Effect coding			
Firm Type	T1	Agriculture Mining &	1	1	0	0	0	0	0	0	0	0	0	0
	T2	Quarrying	2	0	1	0	0	0	0	0	0	0	0	0
	T3	Manufacturing	3	0	0	1	0	0	0	0	0	0	0	0
	T4	Electrical, water, gas	4	0	0	0	1	0	0	0	0	0	0	0
	T5	Construction	5	0	0	0	0	1	0	0	0	0	0	0
	T6	Wholesale	6	0	0	0	0	0	1	0	0	0	0	0
	T7	Transport & Communication	7	0	0	0	0	0	0	0	1	0	0	0
	T8	Finance Community	8	0	0	0	0	0	0	0	0	0	1	0
	T9	Services	9	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1

ii) Accessibility measure

Accessibility measure	Code	Description	Level	Effect coding
Highway Junction	AH1	High	1	1
	AH2	Medium Low	2	-1
Transport Node	ANO1	High	1	1
	ANO2	Medium Low	2	-1
Road Network	SMJRD1	High	1	1
	SMJRD2	Medium Low	2	-1
Rail Network	SRAIL1	High	1	1
	SRAIL2	Medium Low	2	-1

iii) Suitability indicator

Variable	Code	Description	Level	Effect coding	
River	Riv1	Low Suitability	1	1	0
	Riv2	Medium Suitability	2	0	1
	Riv3	High Suitability	3	-1	-1
Land value	Landv1	Low Suitability	1	1	0
	Landv2	Medium Suitability	2	0	1
	Landv3	High Suitability	3	-1	-1
Landmark	Landm1	Low Suitability	1	1	0

	Landm2	Medium Suitability	2	0	1
	Landm3	High Suitability	3	-1	-1
Slope	Slope1	Medium Suitability	1	1	
	Slope2	High Suitability	2	-1	
Amenities	Am1	Medium Low Suitability	1	1	
	Am2	High Suitability	2	-1	

RESULTS

Maximum likelihood was used to estimate the model. The model was estimated using econometric software STATA version 10.0. The estimated parameters shown in Table 2. As one would expect, examining the result for firms located outside of CBD verify that firm types agriculture, mining, electricity, gas and water, and transport are mostly located outside of the CBD. One surprise result is that finance firms are also mostly located outside the CBD. This result is odd and seems at variance with CBDs around the world where finance firms are invariably located in the very heart of the CBD. Is it because such firms, e.g. banks, has many branches, outlets and ATMs located near other businesses outside the CBD for convenience of serving their customers, with perhaps only their HQ and a few branches located within the CBD.

Meanwhile, manufacturing, construction and wholesale firms' type are located in the CBD area. This result also seems a little surprising. Manufacturing and construction firms often involve heavy bulk materials, and often require very large items for transport that are difficult to maneuver within the confines of generally narrower and more crowded road arterials in the CBD with far greater impedance factors (e.g. Not only traffic congestion and tight corners, but traffic lights and pedestrian crossings) than outside the CBD. However, in this case, this result might not surprising because the only office firm of these sectors was examined.

Table 2: Parameter estimates for firm location by type

Location	Parameter Estimates
<i>Agriculture</i>	0.2152*
<i>Mining</i>	0.4033*
<i>Manufacturing</i>	-0.2574*
<i>Electric, Gas & Water</i>	0.2361*
<i>Construction</i>	-0.6089*
<i>Wholesale</i>	-0.1126*
<i>Transportation</i>	0.1425*
<i>Finance</i>	0.2155*
<i>Community Services</i>	(base type)
<i>Amenities</i>	-1.2921*
<i>Slope</i>	-0.0418
<i>River1</i>	-0.0263
<i>River2</i>	0.0496
<i>Landvalue1</i>	0.0198
<i>Landvalue2</i>	-0.0167
<i>Landmarks1</i>	0.0066
<i>Landmarks2</i>	-0.0116
<i>Highway</i>	-0.4243*
<i>Transportation Node</i>	-1.0963*
<i>Major Road</i>	-2.4304*

<i>Rail Network</i>	-0.8493*
<hr/>	
<i>Goodness-of-fit statistic</i>	
<i>LL (0)</i>	-36007.60
<i>LL (Estimated model)</i>	-19086.52
<i>Number of parameters</i>	
<i>McFadden's Rho-square (χ^2)</i>	0.470

*Significant at 5% level

Analyzing the influence of the accessibility indicator, most of the firms in the CBD area hold the negative coefficient which show them co-located nearby. For the stability indicator, the details were analyzed by using interaction effects.

INTERACTION EFFECTS

In order to investigate more detail on a firm's location, a firm's type and the suitability of its address inside or outside of the CBD, the interaction effect on the firm location model was performed. Interaction effects can be defined as an influence that one factor has on the other factor whereby it has a contribution of two or more variables that join together. In this interaction effect, the combination of the attributes will give an extra positive or negative effect to an alternative utility (Grigolon et.al, 2012).

In order to investigate the effects, a model containing interaction between a firm's types and location's suitability was devised. First, a model containing three-level suitability (high, medium and low) was applied. However, since it was found after running the model that the three levels were not significant, the model was simplified by merging medium and low level into only two levels (high and medium/low). Table 3 shows the result of the interaction effects.

Table 3: Result of interaction effect on firm type and the suitability

Interaction effects	Parameter Estimate
<i>Interaction between predictor</i>	
<i>1. Firm type: Agriculture</i>	
<i>Agriculture and river1</i>	-0.4184*
<i>Agriculture and river2</i>	0.7541*
<i>Agriculture and rail1</i>	0.2197*
<i>Agriculture and rail2</i>	0.0755*
<i>Agriculture and node1</i>	-0.2398*
<i>Agriculture and node2</i>	-0.0960*
<i>Agriculture and land value1</i>	-0.5997*
<i>Agriculture and land value2</i>	0.3518*
<i>Agriculture and land mark1</i>	0.0882*
<i>Agriculture and land mark2</i>	-0.5318*
<i>Agriculture and slope</i>	-0.0550*
<i>Agriculture and road</i>	-0.3016*
<i>Agriculture and amenities</i>	
<i>2. Firm type: Mining</i>	
<i>Mining and river1</i>	0.1433*
<i>Mining and river2</i>	-0.3153*
<i>Mining and rail1</i>	0.2382*
<i>Mining and rail2</i>	-0.0788*
<i>Mining and node1</i>	-0.1347*

<i>Mining and node2</i>	0.1972*
<i>Mining and land value1</i>	0.4770*
<i>Mining and land value2</i>	-0.1246*
<i>Mining and land mark1</i>	-0.0344
<i>Mining and land mark2</i>	0.4663*
<i>Mining and slope</i>	
<i>Mining and road</i>	-0.0836*
<i>Mining and amenities</i>	
3. <i>Firm type: Manufacturing</i>	
<i>Manufacturing and river1</i>	-0.0003
<i>Manufacturing and river2</i>	-0.0411
<i>Manufacturing and rail1</i>	-0.1127*
<i>Manufacturing and rail2</i>	0.0799*
<i>Manufacturing and node1</i>	0.0287
<i>Manufacturing and node2</i>	0.0391
<i>Manufacturing and land value1</i>	-0.0331
<i>Manufacturing and land value2</i>	0.0953*
<i>Manufacturing and land mark1</i>	-0.1087*
<i>Manufacturing and land mark2</i>	0.0759*
<i>Manufacturing and slope</i>	0.0045
<i>Manufacturing and road</i>	-0.1570*
<i>Manufacturing and amenities</i>	0.3628*
4. <i>Firm type: Electric, Gas & Water</i>	
<i>Electric, Gas & Water and river1</i>	-0.4659*
<i>Electric, Gas & Water and river2</i>	0.6729*
<i>Electric, Gas & Water and rail1</i>	0.1085*
<i>Electric, Gas & Water and rail2</i>	-0.8672*
<i>Electric, Gas & Water and node1</i>	0.4973*
<i>Electric, Gas & Water and node2</i>	-0.3403*
<i>Electric, Gas & Water and land value1</i>	0.0273
<i>Electric, Gas & Water and land value2</i>	-0.3197*
<i>Electric, Gas & Water and land mark1</i>	-0.0380
<i>Electric, Gas & Water and land mark2</i>	0.1587*
<i>Electric, Gas & Water and slope</i>	1.5167*
<i>Electric, Gas & Water and road</i>	0.4172
<i>Electric, Gas & Water and amenities</i>	-2.0837*
5. <i>Firm type: Construction</i>	
<i>Construction and river1</i>	0.4630*
<i>Construction and river2</i>	-0.4446*
<i>Construction and rail1</i>	-0.0729*
<i>Construction and rail2</i>	0.2369*
<i>Construction and node1</i>	-0.0581*
<i>Construction and node2</i>	0.0137
<i>Construction and land value1</i>	-0.0129
<i>Construction and land value2</i>	-0.0379
<i>Construction and land mark1</i>	-0.0403
<i>Construction and land mark2</i>	-0.1467*
<i>Construction and slope</i>	-0.8962*
<i>Construction and road</i>	0.0265
<i>Construction and amenities</i>	0.4366*
6. <i>Firm type: Wholesale</i>	

<i>Wholesale and river1</i>	0.1517*
<i>Wholesale and river2</i>	-0.2534*
<i>Wholesale and rail1</i>	-0.1592*
<i>Wholesale and rail2</i>	0.1982*
<i>Wholesale and node1</i>	-0.0222
<i>Wholesale and node2</i>	-0.0030
<i>Wholesale and land value1</i>	-0.0447
<i>Wholesale and land value2</i>	0.0678*
<i>Wholesale and land mark1</i>	-0.0174
<i>Wholesale and land mark2</i>	0.0146
<i>Wholesale and slope</i>	-0.2304*
<i>Wholesale and road</i>	0.0970*
<i>Wholesale and amenities</i>	0.5383*
7. <i>Firm type: Transportation</i>	
<i>Transportation and river1</i>	-0.1253*
<i>Transportation and river2</i>	0.0373
<i>Transportation and rail1</i>	0.0697*
<i>Transportation and rail2</i>	-0.0118
<i>Transportation and node1</i>	-0.1926*
<i>Transportation and node2</i>	0.0867*
<i>Transportation and land value1</i>	0.0291
<i>Transportation and land value2</i>	0.0153
<i>Transportation and land mark1</i>	0.0836*
<i>Transportation and land mark2</i>	0.0329
<i>Transportation and slope</i>	0.0622*
<i>Transportation and road</i>	0.0843*
<i>Transportation and amenities</i>	
8. <i>Firm type: Finance</i>	
<i>Finance and river1</i>	0.0169
<i>Finance and river2</i>	-0.1409*
<i>Finance and rail1</i>	-0.1440*
<i>Finance and rail2</i>	0.2059*
<i>Finance and node1</i>	0.0283
<i>Finance and node2</i>	-0.0061
<i>Finance and land value1</i>	0.0243
<i>Finance and land value2</i>	0.0353
<i>Finance and land mark1</i>	0.0230
<i>Finance and land mark2</i>	-0.0416
<i>Finance and slope</i>	-0.3507*
<i>Finance and road</i>	0.0148
<i>Finance and amenities</i>	0.6308*

*Significant at 5% level

From the interaction effects, only the agriculture sector was identified as having a significant positive and negative effects among all suitability indicators. The significant positive effect is between agriculture and (i) river with high suitability, (ii) railways, (iii) land value high suitability and (iv) landmarks medium/low suitability. Meanwhile, the significant negative effect is with (i) river medium/low suitability, (ii) transportation node, (iii) land value medium/low suitability, (iv) landmarks high suitability, (v) slope, and (vi) major roads.

Interaction effect on firm's type and accessibility measure

It is also interesting to examine and interpret the interaction effects on firms' type and its accessibility measure. Figure 1 shows the results. The interaction for each type of firm, illustrated different influence to the accessibility location.

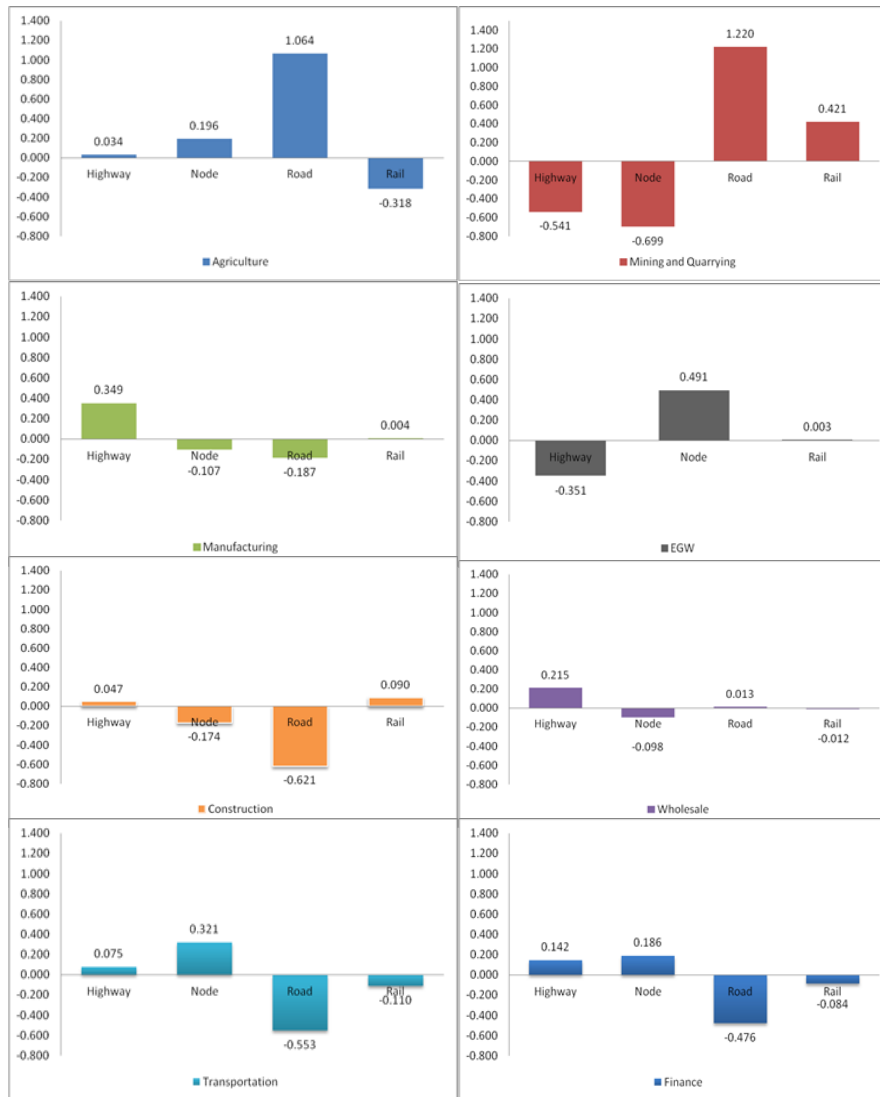


Figure 1: Result of interaction effect of firm type and accessibility measure

From Figure 1 the significant effect of each type of firm with the accessibility component is revealed. Only three sectors have positive and negative significant effects

with the accessibility measure indicator - Mining and Quarrying, Transportation, and Finance.

CONCLUSION

The location of the firm is influenced by the accessibility and suitability indicators, especially in the CBD area. By using discrete choice modelling, the firm location in Kuala Lumpur by its sector can be identified. The results illustrated that some parameters were not significant and most probably due to the location choice of this research, limited only between areas inside and outside the CBD. Basically, the use of discrete choice models in the analysis of firm location decisions gives a foundation to facilitate town planners and decision makers to understand the firm location decisions in their region. It's hoped that the model will contribute to better knowledge and practice and helps improving the decision-making process in the future.

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CO-BENEFIT MODELING AND OPTIMIZATION OF AIR POLLUTION CONTROL IN ISKANDAR MALAYSIA: A METHODOLOGY USING BenMAP

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Abstract

Malaysia is currently experiencing issues of local as well as transboundary air pollution. The issues are especially felt in areas that record high economic growth and rapid urbanization such as Iskandar Malaysia, a fast evolving economic-growth corridor in Southeast Asia. This has led to increased rate of particulate matter emissions, which further led to increase in the rate of respiratory-related health incidences. Many epidemiological studies have proven that particulate matters in the ambient air are associated with adverse health effects. This will affect the existing and future economy of Iskandar Malaysia, where the exposed population may lose their workdays and face increased medical spending. This study focuses on quantifying health and economic benefits from the reduction of particulate matter with a size of 10 micrometers or less in diameter (PM₁₀) using the Environmental Benefits Mapping and Analysis Program (BenMAP) by US EPA. Health impact functions are used to quantify the relationship between a change in PM₁₀ level and number of related health effects among the exposed population. The samples for this research include a continuous monitoring data on the 2014 monthly average of daily PM₁₀, the 2014 population projection of Malaysian Census Data and the PM₁₀ related health cases for 2014 which are focused in the Iskandar Malaysia region. PM₁₀ data are collected from monitoring stations operated by the Department of Environment (DOE). Respiratory related cases such as Upper Respiratory Tract Infection, which is categorized as J10 in International Classification of Diseases, are collected from selected clinics within the study area. The final outcome of the modeling exercise compares the co-benefits of air pollution reduction between the baseline scenario and the control scenario for PM₁₀ level in Iskandar Malaysia. The results of this study are useful in optimizing and improving the existing policies and strategies for controlling air pollution and PM₁₀ emission in Iskandar Malaysia.

Keyword: Air pollution, particulate matter emission, PM₁₀, health benefits, BenMAP

INTRODUCTION

The issue of air pollution has long been discussed globally and air pollution has been proven to have impact on the exposed population. Malaysia is one of the developing countries in Asian region that is not excluded from experiencing serious issues related to air pollution. Increasing urbanisation in Malaysia has led to a growing concern on the

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ambient air quality. As to date, Iskandar Malaysia is one of the regions that undergoes rapid developments in Malaysia but suffers deteriorating level of air quality. The current population in the region is exposed to the deteriorating ambient air quality and is a potential threat that is ever becoming a reality.

The purpose of this research is to explore substantially on the health and monetized benefits of the emission reduction scenario in the air pollution level among the exposed population of Iskandar Malaysia. This study focused on air particles the size of smaller than $10\ \mu\text{m}$ in aerodynamic diameter (PM_{10}). PM_{10} has been a recent concern where epidemiological studies have proven that continuous exposure to air pollution especially particles of less than $10\ \mu\text{m}$ in size affects the health of the exposed. Many epidemiological works around the world continuously associates PM_{10} to serious adverse health effects including daily mortality which consists of all-cause, cardiovascular disease and respiratory disease (Dai *et al.* 2004; Hwang *et al.* ,2002) and is also associated with higher prevalence of respiratory symptoms (Hong *et. al.* 2001). Hwang *et al.* (2007) reported that lung cancer incidence and mortality rates in women increased up to 65% and 27% when a higher PM_{10} concentration was applied. Furthermore, a study done by Iwai *et al.* (2005) reported that a significant correlation was observed between SPM (Suspended Particulate Matter) and ischemic heart disease or hypertensive heart disease in both males and females. As study by Pan *et al.* (2007) proved, symptoms such as asthma, emergency department visits, hospital admissions for respiratory and cardiovascular disease decreases when a clean-energy-use scenario (decreased in PM_{10} concentrations) was implemented and compared to the baseline scenario.

Many studies regarding PM_{10} health effects have been done in countries in Asia such as in China, Japan and Thailand. But, only a number of studies have been done regarding the level of PM_{10} and the associated health effects in Malaysia. A research project report by UKM Pakarunding (2004) discussed on the associations of PM_{10} increments with the significant Relative Risks (RR) outcomes for respiratory and cardiovascular morbidity. In this research we try to simulate the impact of a reduced PM_{10} level as well as its monetized benefits through the Environmental Benefits and Mapping Analysis program (BenMAP) developed by US EPA. To date, there are currently no studies done yet regarding this particular field in Malaysia.

Like other developing countries, Malaysia has developed its own National Air Quality Monitoring Program that is mainly governed by Alam Sekitar Malaysia Bhd (ASMA) and the Department of Environment (DOE). So far, ASMA has established monitoring stations to capture particles that contribute to air pollution such as CO, SO₂, O₃ and PM_{10} in both Peninsular Malaysia as well as in the Sabah and Sarawak. The focus has been to only capture PM_{10} and other particles but less research is done on its contribution to serious health effects among the exposed population in Malaysia.

The DOE monitoring station that are within Iskandar Malaysia's vicinity are located in Pasir Gudang, Johor Bahru and Tampoi. Since this research uses the population data input that is based on the 2010 Malaysia Census Data, all the other data inputs such as PM_{10} monitoring data and health incidence data are based on the year 2010. This research only uses the PM_{10} monitoring data available for the year 2010 that only includes Pasir Gudang and Johor Bahru stations. To address the needs to conduct this research, Figure 1 illustrates the daily mean of PM_{10} monitoring data for 2010 in both stations as well as the recommended guidelines of daily mean of PM_{10} by World Health Organization

(WHO), US Environmental Protection Agency (US EPA) and the guideline set by DOE Malaysia. This shows alarming trends of PM₁₀ in both stations where PM₁₀ exceeded the recommended WHO guideline for daily mean of PM₁₀ and even though Malaysia's and US EPA's recommended guidelines for PM₁₀ daily mean is higher, PM₁₀ level is still at an alarming rate because it exceeded the WHO daily mean guideline for PM₁₀. The occurrence of PM₁₀ daily mean exceeding Malaysia and US EPA guidelines on June and October 2010 shows the incident of trans boundary haze that occurred in Malaysia and neighboring countries. Thus, there is an urgent need to conduct this research in Iskandar Malaysia region before the matter gets worst.

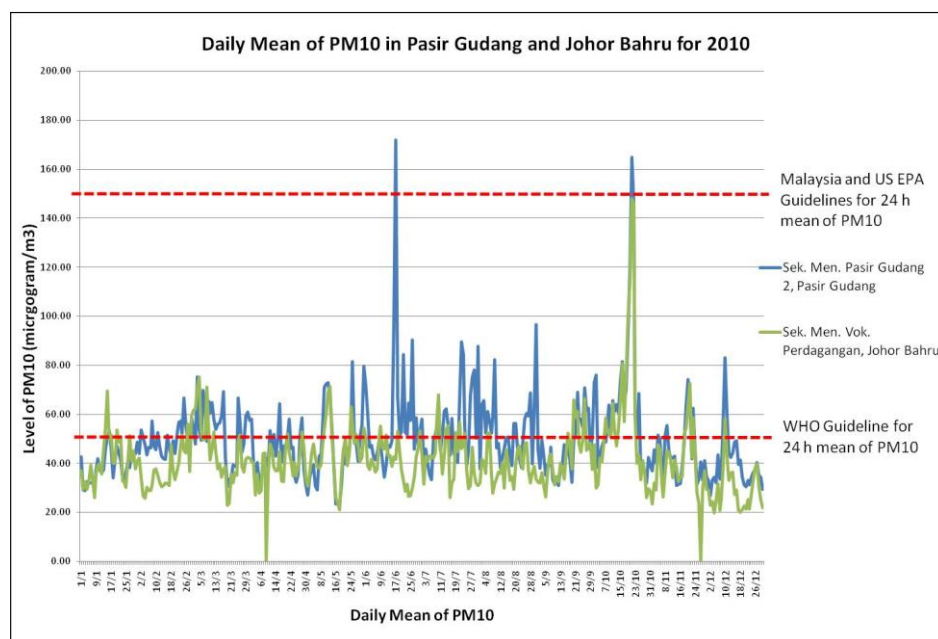


Figure 1: Daily Means of PM₁₀ in Pasir Gudang and Johor Bahru stations in 2010

BenMAP OPERATION

BenMAP is used to estimate the number of avoidable deaths and the monetized value of each of the health cases avoided and to illustrate the economical and health benefits of a PM₁₀ reduction scenario. Figure 2 shows the framework of the policy analysis approach in BenMAP. There are three major stages involved in BenMAP analysis which are: i) producing the air quality surface; 2) constructing health impact configuration; and 3) evaluating the economic costs which involves aggregating, pooling and valuating the reduced health cases. All of these stages have to be completed in order to conduct the analysis step to obtain the results. This paper explains our current progress up to the methodology stage.

The relationship between a change in the concentration of a pollutant level (PM₁₀) and the change in the incidence of a PM₁₀-related health effects are quantified by using

health impact functions (He *et al.* , 2010) obtained from previous epidemiology studies that are done in Asia. A general form of health impact function is as follows:

$$y = y_0(e^{\beta\Delta x}-1)\text{Pop} \quad (\text{Eq.1})$$

where y_0 = baseline incident rate for the health endpoint, β = risk coefficient from epidemiological study, Δx = change in air quality and Pop = population of interest.

Eq. 1 lists the variables needed in a health impact function for a certain health incidence and these functions are also called concentration-response functions (CRF). As to date, the current health impact functions that are available in epidemiology studies are mostly from the developed countries like U.S., Europe and in some Asian countries. So the health impact function for each of the health incidence that will be analyzed in this research will refer to health impact functions in studies that are done in Asian countries, preferably developing countries. This will reduce the uncertainty of this research where health impact functions of similar environment should be used to make the study feasible. The health impact functions are chosen from various studies on the PM₁₀-related health effects and will be adjusted according to Iskandar Malaysia's suitability based on the current baseline incidence rate of health effects and current level of PM₁₀.

Economic costs of these incidence changes can then be estimated by multiplying the changes in incidence by an estimated unit value for the health endpoint (He *et al.* , 2010). These are obtained by using valuation functions from other related epidemiology studies that are done in Asia. One example of the significance of economic benefits in the PM₁₀ reduction scenario is that by Chen *et. al.* (2007), where the implementation of low carbon energy scenarios could reach an economic benefits up to U.S.\$507.31 million to U.S.\$1.49 billion in 2010.

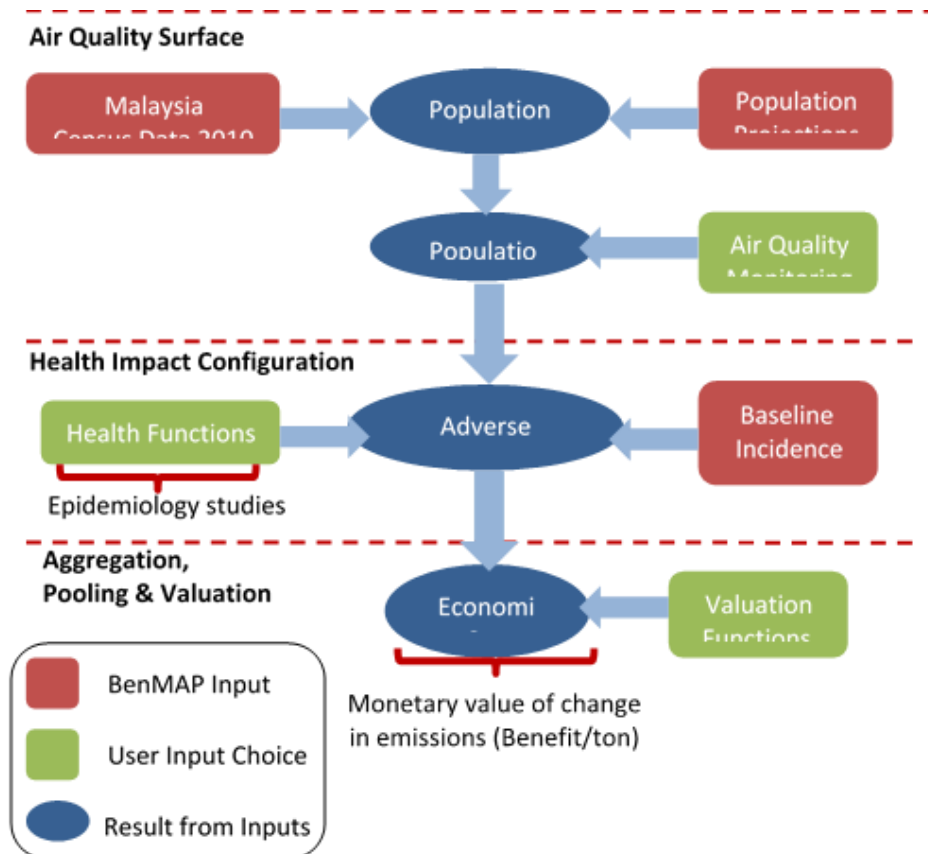


Figure 2: BenMAP Policy Analysis Approach

Data Requirements

The three major stages in BenMAP analysis mentioned above could be further divided into five distinct phases. The first phase in operating BenMAP involves loading externally created data in the format that BenMAP recognizes. The second and third phases involve calculating population estimates and population exposure. The fourth phase is about configuring the health impacts and the last phase is for obtaining the economic costs and benefits from the previous results of the health impacts analysis.

All the data inputs will be adjusted according to formats that BenMAP recognizes. The data input include grid definitions, pollutants to be analyzed, pollutant monitoring datasets, incidence and prevalence datasets, population datasets, health impact functions and valuation functions from epidemiological studies. Grid definitions consist of irregular and regular shapefiles where they illustrate the boundary of Iskandar Malaysia as well as square grids to cover the Iskandar Malaysia region. These square grids are needed in order to show current population estimates and to produce population exposures as well as illustrating the results of the analysis in BenMAP in the future.

Figure 3 illustrates the estimated population based on Malaysia Census Data for 2010 at the district level apportioned according to each grid.

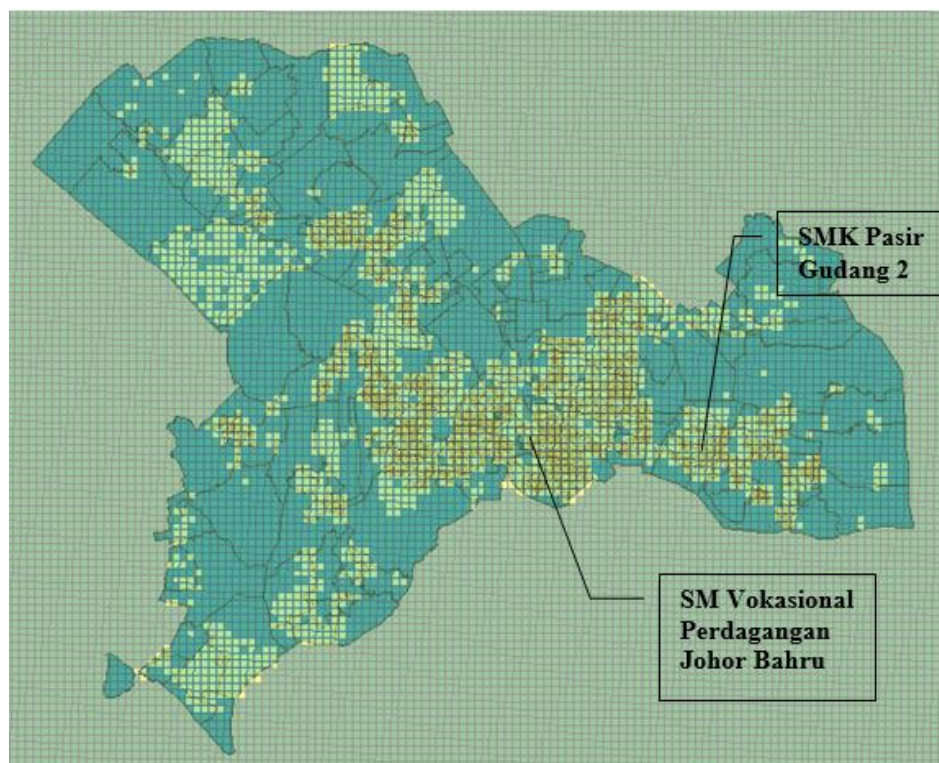


Figure 3: Population estimates based on Malaysia Census Data 2010 for Iskandar Malaysia and the location of DOE monitoring stations

Population Estimates

BenMAP inputs are associated with the existing data on population estimates by which, in Malaysia, the population data used is the Malaysia Census Data for 2010. The data are arranged in Excel format according to the BenMAP Users Manual for 2012. Since the population census are distributed the small census districts in Iskandar Malaysia, the population grid are produced based on the number of people living in each grid to tally with the total number of people living in a certain district.

Population Exposure

In order to obtain population exposure to air pollution, PM_{10} monitoring data are obtained and prepared in the format that BenMAP recognizes. The monitoring data are obtained from DOE stations in Johor Bahru and Pasir Gudang. Even though there are limited numbers of monitoring stations in Iskandar Malaysia, BenMAP have the ability to average the monitoring data for the whole region by using the Voronoi Neighbor Averaging (VNA) process. According to the BenMAP Users Manual for 2012, VNA

process first identifies the set of monitors that surround each grid cell center and calculates the inverse-distance weighted average for the neighboring monitors (in this case, the neighboring monitors are in Johor Bahru and Pasir Gudang). So the interpolation of the monitoring data points for each grid across the region can be done.

The variables in the monitoring data consist of metrics, seasonal metrics, statistic (annual metric) and values. The metric used for PM₁₀ reduction scenario analysis in this research is calculated in Daily Average Values in BenMAP. Seasonal metrics are calculated based on the average values of PM₁₀ in each month so that makes 12 values of seasonal metrics for 12 months in 2010. Since PM₁₀ are observed daily, a value of 365 (days per year) is obtained from DOE data and this data are prepared in Excel files and in the format that BenMAP recognizes.

Adverse Health Effects

This step involves input data of baseline incidence rate which is related to the current number of health effects per person in a certain population per unit of time associated with the level of PM₁₀ in the Iskandar Malaysia region. Table 1 shows the list of health effects that increases with an increased in PM₁₀ level according to the epidemiologic studies done in some Asian countries which will be used in the analysis of this research. With reference to Eq. 1 of health impact functions, this research will later use the beta coefficient for each health endpoint in the list of studies stated below. These health effects are identified based on International Classification for Diseases (ICD-10) codes by WHO to ease the research process analysis and data obtaining process in the future.

Table 1: List of health effects that are related to increased in PM10 level

ICD-10 codes	Health Effects	Studies related to analysis of increased level of PM ₁₀
For respiratory diseases		
J40 – J42	Bronchitis	Chen (2006); Hu (2001); Kan et. al. (2004); Mead & Brajer (2005); Pan et al. (2007)
J43	Emphysema	Agarwal et. al. (2006)
J44	Other obstructive pulmonary diseases (COPD)	Agarwal et. al. (2006); Jang et. al. (2006); Ko et. al. (2007); Pan et. al. (2007); Yang et. al. (2007)
J45 - J46	Asthma	Agarwal et. al. (2006); Jang et. al. (2006); Kan & Chen (2003); Pan et. al. (2007); Bell et. al. (2008)
For cardiovascular diseases		
I20 – I25	Ischemic heart disease	Iwai et. al. (2005); Lee et. al. (2003)

The health effects data have rates that vary by race, ethnicity, gender, and age group. For the purpose of this research whose aim is only to quantify the monetized benefits and health benefits when a PM₁₀ reduction scenario analysis is implemented there is no need to specifically do an analysis that considers all these parameters.

Economic Costs

Aggregation, pooling and valuation stage will be done in BenMAP to obtain the monetized benefits for the PM₁₀ reduction scenario. Based on the BenMAP Manual Case Study for Mumbai (2006), aggregation refers to spatial combination of results from smaller areas to a larger ones, pooling refers to the mathematical combination of two or more results of health impact function into a single result, and valuation refers to applying unit values to incidence results to obtain the monetized benefits. In this stage, valuation function from epidemiologic studies are also needed in order to calculate the economic value for the each of the reduced health endpoint from the reduction scenario analysis. Completion for the previous stage which is conducting the health impact functions for each health endpoint is necessary in order to proceed to this last stage of BenMAP PM₁₀ reduction scenario analysis.

CONCLUSION

It is the hope of this research that it will help policymakers to propose a comprehensive framework in improving the air quality control measures for minimizing costs and maximizing benefits in the health and economic aspects. Evaluation on the current air quality improvement strategies and policies can be done to measure the effectiveness of government initiatives by referring to the results of this research when they become available. The outcome of this research is hoped to further improve the policy framework for ambient air quality in Malaysia, especially in Iskandar Malaysia. It could also help policymakers improve the current policies and reduce the number of PM₁₀-related health cases among the exposed population. From the monetized benefits aspect, the results are expected to reveal the savings obtained from the related reductions in the number of lost workdays, hospital admissions related to respiratory and cardiovascular symptoms and emergency room visits.

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EXPLORING THE IMPLEMENTATION AND SUCCESS OF GREEN URBAN MOBILITY IN ASIAN CITIES

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Abstract

Urban population is rapidly increasing at the rate of 1.83% worldwide. This is accompanied by rise in auto-mobile ownership, which conversely imposes adverse environmental, health, economic and social impact in cities. Green Mobility has emerged as the best approach for promoting sustainable and environmental-friendly transportation in modern cities. This paper relied on secondary data to critically review current transport problems, efforts toward ensuring sustainable green mobility, success of the policies and challenges facing the process in Asian cities. The study found that urban transport problems are becoming worst in the cities. However, efforts are in place to reduce car footprint and promote green mobility in the cities. The global overall average score of cities is estimated at 43.9%, while Asia-Pacific cities have 42.8% average score of green mobility performance. The challenges militating against growth of green mobility in cities include fragmented management, lack of clear vision and strategy for the system, and inadequate infrastructure among others. Integrated and coordinated approach is one of the recommendations made towards ensuring sustainable green mobility in cities.

Keyword: Asian cities; Transport impact; Green mobility; Challenges; Sustainability

INTRODUCTION

Urban population is rapidly increasing at the rate of 1.84% worldwide. Currently, urban population accounts for 54% of the total global population, a rise from 34% in 1960. It keeps on growing with about 60 million people moving into cities and urban areas every year; approximately over one million every week (Lee et al 2010; WHO, 2015). Projection shows that by 2050 about 70% of world's population will live in cities. Asia and Africa are the most urbanising regions worldwide. Today, 15 of 27 largest cities in the world are in Asia. Moreover, Asian urban population is predicted to exceed rural population by 2022 (Brinkhoff, 2012; Kapsch, 2013; Lohani, 2014). Such population explosion is accompanied by rise in auto-mobile ownership which conversely imposes adverse environmental, health and social impacts. This in turn generated tremendous concern and desire to seek for means of combating such effects in cities.

Expanding the capacity and building more roads were initially envisaged as sole means of overcoming effects of urban transportation and meeting the demand for accessibility and mobility. But this stimulated more growth in car ownership and usage; resulting to ever-increasing congestion, pollution and environmental degradation. This

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prompted agitation for urban sustainability – a term referred to as sustainable cities, smart cities, zero-energy cities, low-carbon cities or eco-cities (Hawley, 2014). The concept entail that cities should be made ‘user-friendly, safe and healthy for habitation through improving mobility - sustainable transportation; a term also known as ‘Sustainable Mobility,’ ‘Green Transportation,’ or ‘Green Mobility.’ Evans (2011) defines Green Urban Mobility as a ‘means of creating flexible, responsive, safe, affordable and efficient mobility in cities with less traffic, travel and effort while ensuring environmental sustainability.’ In other words, it means giving much priority to public transport, goods vehicles, pedestrians and non-motorised vehicles which ensures that transport system is made accessible for all and sundry (Midgley, 2011).

In the last few decades, concern and interest has been geared towards promoting sustainable mobility in cities globally. Emphasis lies on provision of public transport, cycle paths, health and safety awareness campaign, development of bike-sharing schemes, and facilitating cycling and electric car sharing as alternative mode of transport for short-distance trips. The private sector focuses on sustainable schemes, such as Company Vehicles Sharing and development of innovative technologies such as ebikes (Electric Bikes) and provision of vehicles and infrastructures. Other measures are redistributive schemes like clean docking stations; smartcard integration with public transit; fleet monitoring and integrated fare schemes such as GPS/GNSS tracking and touch screen kiosks (GSM, 2015). This paper looks at urban green mobility in Asia with specific examples drawn from East and Southeast Asian cities. It highlights current transport problems, green mobility practices, success of the policies and factors militating against growth of green mobility in the cities.

URBAN TRANSPORTATION PROBLEMS IN ASIAN CITIES

Asian mega-cities face numerous and ever increasing urban transport problems. Such include rapid growth in number of motorised and non-motorized vehicles. For example, between the year 2000 and 2010, Singapore’s car population increased at 3.4% per year, of which 1.2% were motor cycles and scooters (LTASG, 2010). In Laos, motorcycle increased at 13% per annum before 1997 and later stabilized at 9% (Chin, 2013). In Cambodia, motorization accelerates at 7%. About 52,000 cars are added onto Bangkok streets monthly (The Nation, 2010). In Philippines, the rate of private vehicles grew rapidly from 4,558,727 in 2007 to 5,216,646 in 2009; an annual growth rate of 7% (LTOPH, 2010). In Myanmar, the number of cars grew at a steady rate of 5.2% per year between 2004 and 2008 while motorcycles increased at 0.8% per year before 2007 (Chin, 2013) In Shanghai, private car ownership increased from 12 million in 2003 to 93 million in 2012 (Ding, 2014).

Growth in population of vehicles generates various social and environmental problems in Asian cities. Such comprise increased congestion, travel time, fuel consumption, pollution, accident, road rage, inadequate parking space and loss of worker productivity (Pai, et al 2014).

Mix operation of pedestrians, motorized and non-motorized vehicles is a major characteristic of roads in Asian cities. Inevitably instigating disorder and confusion, which hinder smooth flow of traffic and limits efficiency of road network. This generates safety problem to other road users and also contribute to air and noise pollution in the cities (Chin, 2013).

Another critical transport problem is traffic congestion. Jakarta (Figure 1) ranks number one of the ten top traffic congested cities across the globe (wsj.com, 2015). Bangkok ranks eighth among the top ten worst gridlocks worldwide (Siemens, 2014). As a result countless hours and billions of dollars worth of fuel and productivity are lost to traffic jam yearly. In 2011, traffic congestion costs in Jakarta city was estimated at Rp 46 trillion (US\$5 billion) per year. The costs of wasted fuel, productivity lost and traffic-induced health problems resulting from traffic congestion is estimated at Rp 28.1 trillion each year in Jakarta (Adiansyah, 2012).



Figure 1: Traffic Congestion with Mixture of Cars and Motorcycles in Jakarta City, Indonesia

Source: <http://qz.com>. Retrieved 19/05/2015

Personal safety and public health are threatened by the operation of non-motorized vehicles in Asian cities. In Singapore, non-motorized vehicle users accounted for 9.3% of total people killed and 5.3% of total injuries in traffic accidents in 2009. Likewise, in Bandung, Indonesia, about 21% of bikecab users sustain injury during accidents at least once in life (Chin, 2013). In Indonesia, Malaysia and Thailand, cyclists account for 6% to 7% of all road traffic deaths while 47% pedestrians experience accident. In Taipei, about 54.5% fatalities from traffic accident are generated by motorcycles (Chang, 2012; Chin, 2013).

Motorised vehicles equally account for high traffic accident in Asian cities. For instance, in 2005 Phnom Penh, Cambodia registered 105,800 car accidents and 380,000 motorcycle accidents. The figure increased to 122,800 cars and 448,000 motorcycle accidents in 2006. In Yangon, Myanmar, a total of 2,498 injuries and 208 deaths were recorded from road accidents in 2008 (Chin, 2013). In Taiwan, motorcycles constitute 80% of fatality and 90% of injury cases in traffic accident (Pai, et al 2014). China is listed among the highest contributors to world's traffic fatalities. With only 3% of the world's vehicles, China accounts for 24% of the world's traffic fatalities. In 2011, road fatalities

amounted to 62,387, of which 28% were motorcycle users. The mortality rate from traffic accident was 8.7 per 100,000 people in urban areas. Traffic accident cost Chinese economy about \$21 billion per annum (Ding, 2014).

Emission from road transportation system is another matter of serious concern in the cities. Transport sector contributes high rate of carbon emissions in cities. For instance, between 1980 and 2005, Philippines and Viet Nam transport sector carbon emission accelerated from 15% to 37% and 14% to 25%, respectively. In Malaysia, the emission remained steady while in Indonesia and Thailand it respectively declined from 26% to 22% and 28% to 26% (Timilsina and Shrestha, 2009). High energy consumption is generated by rapid increase in motorised and non-motorised vehicles in Asian cities. Figure 2 below shows Riyadh as the highest and Ho Chi Minh City as the lowest in private passenger transport energy consumption.

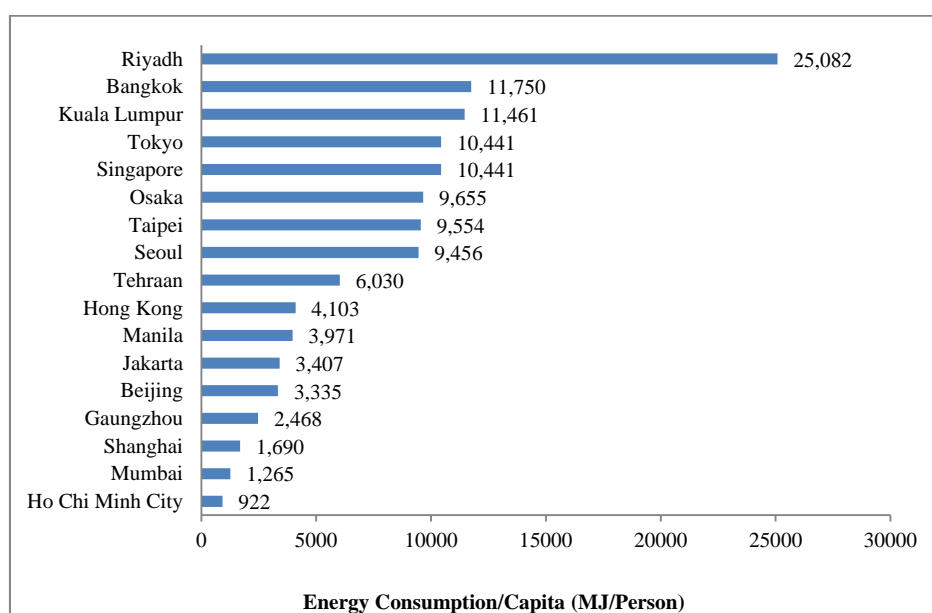


Figure 2: Private Passenger Transport Energy Consumption Per Capita in Asian Cities
 Source: Kenworthy, 2013

The ‘units of energy required per unit GDP created is known as transport energy intensity’ (Chin, 2013). This unit is estimated to determine energy consumption of transport sector. In 2005, Malaysia had the highest transport energy intensity; estimated at 53 kilotons oil equivalent per billion US\$. This was followed by Thailand with 38; Indonesia, 34; Viet Nam, 28 while Philippines had the least, about 22 kilotons oil equivalent per billion US\$ (Timilsina and Shrestha, 2009). In 2009, Singapore had an estimate of 37 kilotons oil equivalent per billion US\$ (Chin, 2013). With subsequent rise in vehicle ownership, energy consumption in these countries is assumed to have increased by now. Fuel consumption is often considered as a direct measure of carbon emission. Road vehicles consume more fuel than any other mode of transport. For instance, in Thailand, transport sector use about 25.4 billion litres of fuel yearly, of which road-based

vehicles consume over 99%. The transport sector energy demand for Thailand is projected to 64.7 megatons oil equivalent in 2050, a rise of 2.5% from 1995 (Chin, 2013). In Manila, tricycles alone use about US\$5 billion of fuel every year (Maslog, 2015). Such high fuel consumption cost countless billions of dollars, generates air pollution and threatens the health and comfort of urban dwellers.

Significant reduction in urban air quality (Figure 3) is recently experienced due to increase in vehicle ownership and over dependence on motor vehicles in the cities. Three of the top five carbon dioxide emitting and 11 of the 20 most polluted cities in the world exist in Asia (ADB, 2015). About 16 of the world's 20 cities with the worst air quality are in China. In Vientiane, Laos, rise in number of vehicles has resulted to decline in air quality. In Bangkok, diesel trucks, two-stroke motorcycles and outdated bus fleets significantly contribute to air pollution. In Cambodia, vehicle emission generates serious environmental degradation, health hazard and retard economic growth (Chhoeurn, 2007; Chin, 2013).



Figure 3: Air Pollution in Zhengzhou City, China
Source: chinadaily.com.cn Retrieved 19/05/2015

Noise pollution is also a menace in Asian cities. For instance, in Vientiane, Laos, noise level range from 79.5dB to 85.0dB. This is more than the international norm of 70dB. In Bangkok, noise level along overcrowded roads is between 70 dB to 85 dB all round the clock. In Viet Nam, noise pollution from transport is said to be a serious urban concern which needs an urgent attention (Truc, 2003; Schwela and Wele, 2009; Chin; 2013). Shortage of parking spaces is experienced in most cities. In Beijing, there are 2.7 million parking spaces against 5.3 million motor vehicles. Shanghai has 780 k parking slots serving 2.6 million vehicles. Chongqing city has shortage of 190 k parking spaces with deficit growing by 400 spaces daily. Estimate of parking fees account for over 1/3 of the annual costs of owning a car in the city. Hence, roadside parking has become a common phenomenon while others use open-air and playground as parking slots (Meilhan, 2014). Manifestation of the aforementioned phenomena and desire to curtail

their consequences led to agitation for practice of green urban mobility as discussed in the next section.

PRACTICE OF GREEN URBAN MOBILITY IN ASIAN CITIES

Non-motorized Transport

The commonest strategy used to curtail consequences of urban transport system is promoting cycling and walking. Figure 4 shows the percentage of daily trips by Non-motorized transport mode in Asian Mega-cities. Shanghai is the highest while Riyadh is the lowest city using non-motorized transport system.

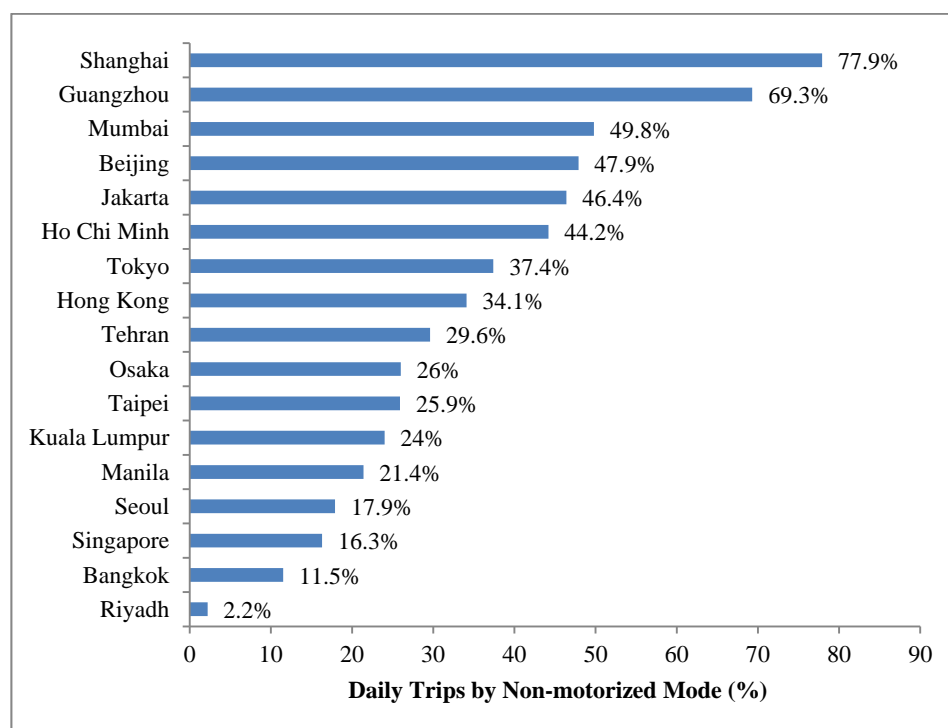


Figure 4: Share of Trips by Non-motorized Transport Mode in Asian Cities
Source: Kenworthy, 2013

Several reasons led to encouragement of cycling and walking in the cities. For instance, Sibui city in Sarawak introduced pedestrian network to link the town's bus terminal. This is aimed at reducing traffic congestion and to encourage use of public transport and cycling. (Tseu, 2006). In Melaka city, walkways in historic neighbourhoods are preserved and restricted from automobiles (Figure 5). This protects culture and history of the city besides making it more liveable. Similarly, in Hue city, Viet Nam, historic colonial districts are preserved and revitalized to serve as walkability area and tourist site (ADB, 2015). Vientiane, Laos plan to improve walking and cycling from 200,000 trips to

300,000 trips in 2007 and 2025 respectively, with annual growth rate of 2.3% (Toda, 2008).



Figure 5: Melaka Neighbourhood Walkway
Source: Chiang, 2013

Cycling is an environmentally friendly, cost-effective, healthy and emission-free means of transport, which provides door-to-door service (Mbuya and Guni, 2011). Asian region is the fastest growing bike-sharing market in the world (Shaheen, et al 2010). The largest and most famous bike-sharing program in Asia is the Public Bicycle system in Hangzhou. The system started operating with 40,000 bicycles and 1,600 stations (Shaheen, et al 2010). Number of bicycle rent in the city doubled from 3.5 million in 2009 to 7 million in 2012. In turn, this system has reduced Carbon dioxide emission estimated at 350 Kilo tonne between 2009 and 2012 in the city (Meilhan, 2014). With 5,500 bicycles, Guangzhou bike-sharing system give people wide array of choices to move easily throughout the dense city (Mullich, 2011). Other cities with bike-sharing programmes are Beijing having 21,000 bikes, Taipei 500, Nubija 430, Tianjin and Suzhou.

Public Motorized Transport

Public transport has become popular mode of transportation in Asian cities. For instance, bus fleet in Philippines increased at 3.4% yearly from 1990 to 2007 (Sheila, 2010). Likewise in Myanmar, between 2004 and 2008, the number of buses increased at 2.3% per year to match the increase in patronage (Chin, 2013). Figure 6 shows the percentage

of daily trips made by public transport mode in Asian Mega-cities. Manila ranks highest while Riyadh is the lowest in share of public transport mode.

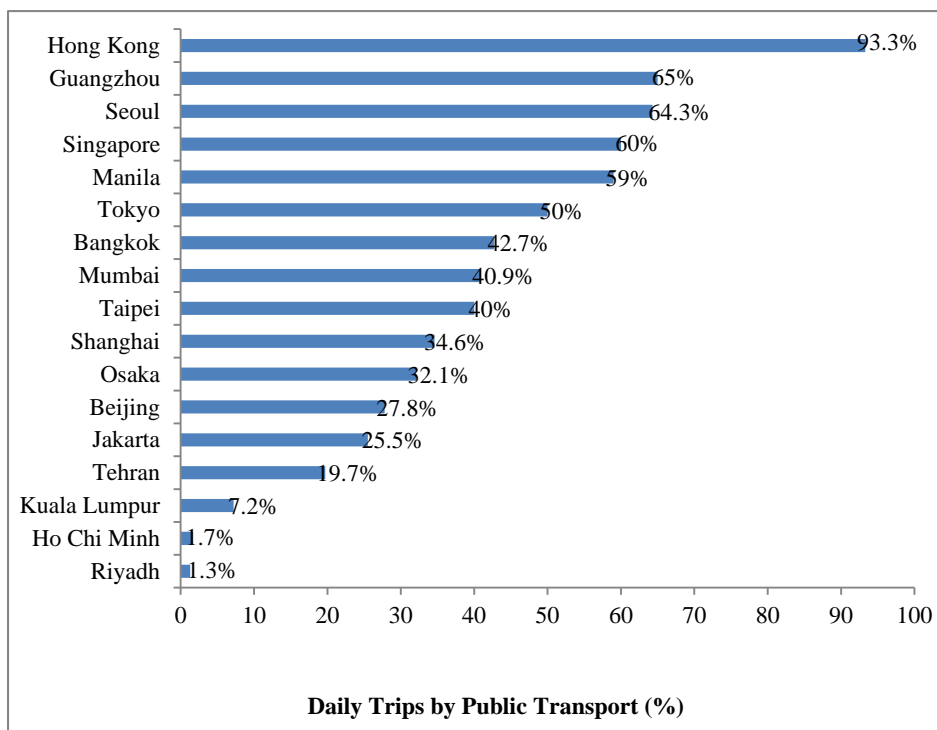


Figure 6: Percentage of Daily Trips by Public Transport Mode in Asian Cities
 Source: Andreasson, 2011; UNDESA, 2012; Cheong & Loh, 2013; Kenworthy, 2014; Pai et al, 2014

Bus Rapid Transit

Bus Rapid Transit (BRT) is ‘high-quality bus-based transit system which delivers fast, comfortable, and cost-effective urban mobility’. Irigolen and Dalkmann (2015) observe that BRT and bus priority systems enhance traffic safety and as well improve the health of city residents by reducing air pollution and increasing rates of physical activity, which manifest in longevity and quality of life. BRT is implemented in cities to promote overall transport efficiency (Midgley, 2011). Guangzhou Bus Rapid Transit system with 805,000 daily boarding is the largest ridership of bus corridor in Asia (Figure 7). About 12,000 passengers commute per hour; almost 42% of personal trips in Delhi (India) are made by BRT (Kogdenko, 2011). In Seoul, BRT initially serviced over 2.1 billion people yearly; but daily average later rose to 9.83 million passengers. This led to improvement in air quality with about 58 µg/m³ reduction in ambient concentration of pollution particles in 2005 (Seoul metropolitan Government, 2006). The BRT in Beijing conveys about 100,000 commuters daily (Mackett, et al 2013).

In Jakarta, Indonesia ‘Trans-Jakarta Bus-way’ was initiated on 15 January 2004. As a result, 20% of bus-way users forfeited private cars. The ridership subsequently

increased to 46,000 passengers per day. Currently, Jakarta BRT ridership is 350,000 passengers daily (ITDP, 2013). In Bangkok, 50% of passenger trips are conveyed with buses, increasing to 75% during peak hours. Cities like Metro Manila (Philippines), Phnom Penh and Siem Reap (Cambodia) have scheduled buses as major means of public transport. In Yangon, the bus system makes 19,000 trips/ day serving 4.4 million persons per day (Chin, 2013).

The major drawback of public transportation is inadequacy of service compared to mobility demand by public in most cities. The stops are often characterised by inefficient services, irregular arrival, long waiting time and overcrowding. In turn, this often results to theft, mugging, harassment and other forms of delinquencies (Baedeker and Huing , 2012).



Figure 7: Bus Rapid Transit (BRT) in Guangzhou, China
Source: Simes, 2011

Mass Rapid Transit

Urban rail, known as mass rapid transit (MRT) is an emerging public transport system in Asian cities (Ely, 2012). Shanghai has the longest metro network at 425km worldwide, serving 2.1 billion passengers in 2011. Next to it in Asia is Beijing, followed by Seoul and Tokyo. Singapore MRT system serves 2.3 million passenger trips a day since 2011 (Ely, 2012). Bangkok's overhead Sky-train and underground subway system account for 450,000 and 210,000 daily passenger trips respectively (Siemens, 2013). Initially, the two light rail lines in Manila were conveying 500,000 passengers daily. But patronage of the light rail transit (LRT) rose by 29% within a year – 118 million to 147 million passengers in 2004 and 2005 respectively (Chin, 2013). Subsequently, it conveyed 20% yearly and settling 372 million passengers in 2010 (Chua Co, 2011). Malaysia proposes to complete over 100 kilometres of new subway lines by 2020 to link Kuala Lumpur with the suburbs. By 2016, trains are expected to operate on new 51-kilometer route connecting the north-western and south-eastern parts of the city (Siemens, 2014).

Emission Control

Control of emission at the source from vehicle is gaining ground in Asian countries. Thailand has banned leaded gasoline. In Manila, maximum hydrocarbon emissions from vehicles operating in urban areas is set at 7,800 parts per million (EMB, 2004). Table 1 presents percentage of sulphur content in diesel fuel for some Asian countries. Singapore, with maximum of 0.005% is the most stringent against sulphur content in diesel (NEA, 2013). Next to it is Thailand as indicated on table 1 below. The major problem with emission control is inadequate implementation strategy. Although city like Singapore has installed video camera to capture smoky vehicles, most cities lack well coordinated institutions to inspect and execute vehicle users defaulting emission control regulation.

Table 1: Standard for Diesel Sulphur Content in Some Asian Countries

Country/Area	Year of Implementation	Diesel's Sulphur Content (wt%)
Japan	2000	0.05
Taiwan	2000	0.05
Thailand	2002	0.035
Manila	2004	0.05
Malaysia	2005	0.05
Myanmar	Unknown	0.02
Viet Nam	2007	0.05
Singapore	2006	0.005

Source: <http://www.unep.org/>, 2011; Chin, 2013

Legislative measures such as Vehicle engine management, inspection and maintenance, roadside monitoring and regulation on noise level is promoted to reduce environmental effect of urban transport in some cities. In Bangkok, cars use catalytic converters; almost 80% of motorcycles operate on less polluting four-stroke engines while smoky vehicles are inspected daily (Chin, 2013). In Manila city, emission violators are fined and the fund is used for Air Quality Management such as research, restoration, outreach, technical assistance and for regulatory activities on air pollution control (Krupnick et al., 2003). Malaysia has introduced measures to reduce air pollution from mobile sources. Singapore conducts chassis dynamometer smoke test in vehicles to ensure free acceleration. Myanmar adopts maximum noise level of 115dB as a measure for traffic noise management (Chin, 2013). In Taipei city, air pollution is controlled from mobile source by encouraging use of low emission vehicles and enhancement of testing and elimination of high pollutant vehicles. Educating the public to periodically examine and maintain vehicles according to Bureau of Environmental Protection regulation is another strategy (Schwela and Wiele, 2009).

Alternative Clean Energy

Use of environment-friendly fuel options - alternative clean energy or bio-fuel is encouraged in some cities. In Phnom Penh, price of gas has been subsidized half that of petrol to encourage taxi operators and private car owners convert their engines and use gas. The use of gas alternative fuel for transport system is promoted in Bangkok while use of natural gas vehicles is encouraged in Ho Chi Minh and Kuala Lumpur (Chin, 2013). Manila has about 10,000 while Malaysia own 30,600 natural gas motor vehicles. Malaysia

has also introduced ENVO Diesel - containing 5% palm oil and 95% petroleum diesel, emitting less nitrogen oxides, carbon monoxide and hydro-carbon (Kalam and Masjuki, 2011). Ho Chi Minh City adopts 'environmentally sustainable measures such as conversion of street lamps to less-polluting and more energy-efficient (LED) light emitting diode' (Chin, 2013).

Traffic Management

The major approach used for Traffic management is separating motor vehicles from non-motor vehicles by prioritising and dedicating lanes for buses and bikes. Development of bus lane in Kunming city, China attracted 50% rise in buses using the corridors and about 8,000 hourly passenger trips per lane (Mohan, 2005). Parking restriction is another traffic management strategy. This is implemented in Beijing by weekly 'No Driving Day' prohibiting vehicles with certain last plate number from operating, which is rotated throughout the year. Vehicle Quota System (VQS) is used to manage the growth of vehicle ownership in Singapore, Shanghai, Beijing and Guangzhou (Baedeker and Huing, 2012). In Peninsular Malaysia and Singapore, electronic ticket is used for online booking and payment of intercity public transport system (Midgley, 2011).

Congestion pricing policy is used to restrict traffic congestion in downtown areas. It involves charging vehicles for entering busier downtown areas; aimed at reducing their number by raising revenue. Three cities reckoned worldwide as where congestion pricing is most successful include Singapore, London and Stockholm. In London, the policy has reduced number of vehicles in city centre by 45%, while in Singapore it is by 33%. Beijing has also implemented congestion pricing, the first Chinese city to do so (Midgley, 2011; Maslog, 2015).

SUCCESS OF GREEN MOBILITY POLICIES IN PROMOTING ECO-FRIENDLY ENVIRONMENT IN ASIAN CITIES

Green mobility policies are mechanisms used to achieve sustainable transport system in cities. The success incurred by such policies in promoting eco-friendly environment in Asian cities is here highlighted.

Provision of public transportation, subway lines, MRT and BRT lines and bicycle stands has promoted safer transport in some cities. As a result, good number of road users opted to shift from private cars to public transport mode. In Beijing, provision of 7 subway lines and 153 new BRT lines accounted for 39.7% mobility in 2012 compared to 29.8% in 2005 (Meilhan, 2014). In Seoul, BRT serve about 9.83 million passengers daily. This led to improvement in air quality with 58 µg/m³ reduction in ambient concentration of pollution particles in 2005 (Seoul Metropolitan Government 2006). New BRT system in Ahmedabad, has succeeded in reducing fatalities on corridors by 55% (Welle, 2014). Guangzhou BRT has reduced Carbon dioxide emissions by 45,000 metric tons (Colins and Shu 2012). In Hangzhou, China, increase in bicycle rent succeeded in reducing carbon dioxide emissions of 370 Kilo tonnes between 2009 and 2012 (Meilhan, 2014).

Traffic management policies are successful in some of the cities. In Singapore, road pricing scheme has raised proportion of people travelling to workplace by public transport from 46% to 67% in 1975 and 1998 respectively (Baedeker and Huing, 2012). Dedicated lanes for buses and bicycles are also improving urban mobility in some cities. In Kunming city, bus lane system has raised public transit mode share from 6% to 24%

in 1999 and 2010 respectively. Average waiting time for bus has decreased by 59%, while bus lane capacity accelerated from 2,000 commuters per hour per direction to 7,500 (Meilhan, 2014). In Taipei, the system has reduced number and severity of road accident ((Schwela and Wiele, 2009). In Seoul, replacement of Cheonggyecheon highway with riverfront, walkways and public squares has drastically curtailed traffic congestion featuring eco-friendly scenery in the territory (Replogle and Kodransky, 2010).

The use of electric vehicle, incentives and tax reduction on purchase of electric vehicles is gaining ground in Asia. This resulted to 80% purchase of new electric vehicles comprising hybrid, electric, natural gas and fuel cells in some Chinese cities, 2012. The sales of electric cars rose by 32% from 12,791 in 2012 to 17,642 in 2013 (Meilhan, 2014). In Singapore, number of green vehicles increased from 140 to over 1500 in 2005 and 2007 respectively. As a result, fleet composition is curtailed which enhance fuel economy and reduce air pollutant emissions in the city (GFEI, 2010).

Implementation of vehicle quota system through new car plate license has resulted to decline in car sales. This in turn limited growth of car usage in Singapore and Shanghai (Baedeker & Huing, 2012). Similarly, Beijing and Guangzhou recorded 52% and 30% drop in car sales respectively in 2012. In consequence, Guangzhou experienced 60% increase in patronage of public transportation, while Beijing had 25% reduction of emissions from motor vehicles (Meilhan, 2014).

Parking fees encourage private car users to shift to other modes of mobility which reduces vehicle ownership in cities (Baedeker and Huing, 2012). In Beijing, higher parking fees in non-residential areas have resulted to 12% decline in traffic volume and 25-35 minutes reduction in traffic jam within central areas.

Restriction on circulation of motor vehicles and motorcycles reduce traffic congestion and air pollution level in some of the cities. The nationwide restriction on motorcycle circulation in urban areas of China is yielding positive outcome. In Foshan city, the policy resulted to decline in use of motorcycle for urban transport from 38.6% to 19.7%. In Guangzhou motorcycle related accidents decreased by 20% while death reduced by 8%. Kunming city experienced 35% decline in death caused by motorcycles. In Beijing, restriction of car usage based on odd and even plate numbers reduce about 800,000 vehicles from operating daily, a fall in traffic volume by 19.5%, speed on roads has improved by 15% while PM10 emissions is curtailed by 7% (Replogle and Kodransky, 2010; Meilhan, 2014).

Fuel economy standards reduce oil consumption, air pollution and carbon in the cities. In China, between 2002 and 2006, the standard curtailed fuel consumption of new LDC fleet by 11.5%. In 2012, India recorded increase in fuel economy of 10% higher than in 2008. This led to decline of 23% in fuel consumption related problems due to advancements in engine technology and adaptation of smaller engine capacities in automotive industry (Thakkar and Buresu, 2012).

Little et al (2014) used 19 criteria to assess mobility maturity and performance in 84 cities worldwide. Result of Urban Mobility Index shows a global overall average score of 43.9%. This indicates that most cities are still lagging behind and not adequately equipped to cope with the challenges of urban mobility. Among the regions surveyed, Europe has the highest (42.6%) score of urban mobility system worldwide. Next are Latin America (43.9%) and Asia Pacific (42.8%) cities with slightly below average performance. North America - USA and Canada has (39.5%) overall performance. Africa

and Middle East are the lowest performing regions with total averages of 37.1% and 34.1% respectively. In regard to individual city performance, Hong Kong is the highest (58.2%) globally. Hanoi ranks lowest (30.9%) among the cities surveyed in Asia as indicated on figure 8 below.

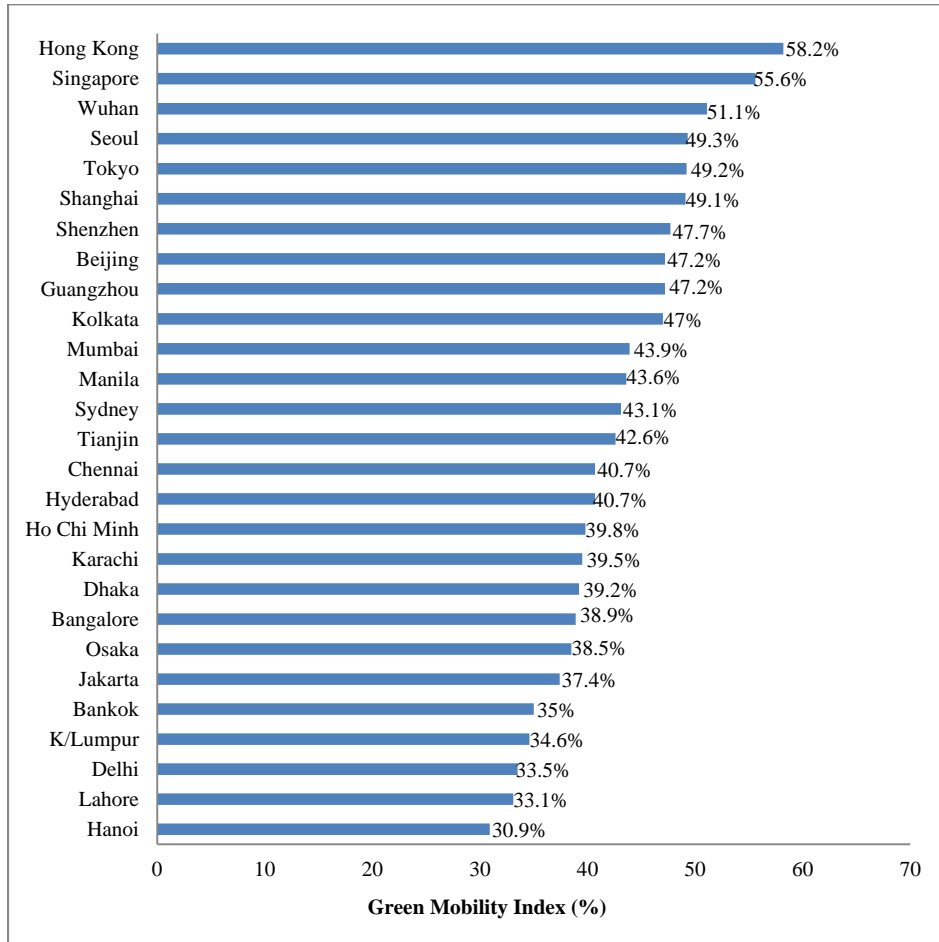


Figure 8: Green Mobility Index of Asian Mega-cities

Source: Little et al, 2014

CHALLENGES TO GROWTH OF URBAN GREEN MOBILITY

Lack of clear vision and strategy is a major challenge militating against growth of urban mobility in most cities. This often results to formulation of policies that are incompetent or not compatible with mobility demand of the public. Such policies are either limited in scope or lack clear guidelines for implementation or monitoring of green mobility system.

Absence of coherent and co-ordinated linkage of green mobility policy across the tiers of government and various environmental management sectors is also a hindrance to growth of green mobility system (Hammer, et al, 2011). As a result, mobility strategies

are often designed and implemented at city-level without consideration of regional mobility need. This limits optimum interaction and resource exchange at regional level, which is a serious menace to sustainable mobility.

Management of urban mobility is solely operated by city governments. There is no much regard for participation by relevant stakeholders such as environmental management ministries, citizen groups, marketers, transport cooperatives, media, educational and training institutions (Jain, 2013) in deciding transport policies, plans and practices. Hence, the system is managed based on single instead of integrated and collaborative effort seasoned with broader opinion, knowledge, and priorities that would produce efficient policies and implementation strategies. Inadequacy of non-motorized transit and public transport service is another factor retarding growth of green mobility. Most cities do not have provision for pedestrians, cycles and other non-motorised facilities. For example, nearly 90% of roads in Asian cities have no provision for sidewalk (Jain, 2013). This generates mix operation of pedestrians, motorized and non-motorized vehicles; resulting to disorder, confusion and accident on roads in the cities.

Limited knowledge on environmental and health effects of transport emission make the general public not to comply or obey some traffic legislative and management regulations. Other factors such as lack of standards and weak institutional and enforcement set up to implement policies impede effective implementation of urban mobility policies in most cities (Chin, 2013).

CONCLUSION

Green Urban Mobility promotes social, economic and environmental friendly transit in modern cities. Socially, it is a basis for realization of social right, gender dignity and equity in the cities. Economically, 'it is a powerful tool for economic growth, poverty reduction, social inclusion and gender empowerment' (Jain, 2013). Hence, all people: men and women, rich and poor, young and old, without any deprivation, desire adequate and equal access to mobility services. It is therefore not out of place that green mobility has recently become a global, regional, national and local interest and agenda. In order to ensure sustainable mobility system, the challenges retarding its growth must be overcome. The following are recommended as basic strategies and way forward.

Green urban mobility system need to have clear and integrated policy designed within national framework. The responsibility of each tier of government should be properly spelt out for efficient guidance. Federal government should set policies; state government should interpret while local government should implement such policies at local level.

Meaningful collaboration and partnership need to be established between public sector, private sector and communities over green mobility agenda; a concept known as 'Public-Private-Partnership' or 'Co-responsibility' approach (Mohanty, 2012). The ability and interest of relevant government or non-governmental stakeholders should be given keen consideration in planning and implementation of green mobility policies.

Government needs to provide dedicated facilities for pedestrians, cycles and other non-motorized transits in cities (Lehmann, 2010). Plans should be made to improve efficiency of public transport, create footpaths and develop urban bicycle and bus lanes in downtowns. Car-sharing and bicycle-renting businesses need to be encouraged. Government should as well initiate policies that will encourage use of energy efficient,

bio-fuels and low emission vehicles, and create public awareness on the use of green transport modes.

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ANALYSIS OF SHRINES PROPERTIES USING REMOTE SENSING APPROACH: CASE STUDY OF LEMBAH BUJANG

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Abstract

The heritage of Lembah Bujang, Kedah is important as a starting point to understand the origins and history of civilization in Malaysia. This research is to analyze the spectral reflectance of shrines properties in an identified area by using remote sensing techniques in conserving this cultural heritage site. The remote sensing device (Spectroradiometer) was used to measure the spectral reflectance of the source of shrines in the study area. This tool was applied for reflectance's test over properties such as ancient brick, granite, literates and iron in a different two study areas consist of Lembah Bujang and Kompleks Sungai Batu. Remote sensing test properties demonstrate that discrimination of properties types of each civilization is possible through reflection measurement, but that discrimination is complicated by surface conditions, such as weathering and lichen growth. Comparison between clays, granite and iron show that clays to be more reflective than granite and iron. This result will help more in our further study on detecting these properties direct through remote sensing imagery and will be helpful in developing new indexes and selection of threshold value on shrines material in the case study of Lembah Bujang.

Keyword: Shrines, Lembah Bujang, Remote Sensing, Spectroradiometers, Land Use Planning

INTRODUCTION

Lembah Bujang is located in Sungai Petani, Kedah (northern Malaysia), and specifically in Merbok district of Kuala Muda. It became a starting point of the civilization of the Kedah Tua Kingdom and a strategic area for a trade and industry (Jacq-Hergoualch, 1992, Bellwood 1997). In the fourteenth century, the Merbok Estuary was an important port and trading center for traders from China, India and the Middle East (Khoo, 1996). It has been believed that over 50 shrines and hundreds of the relics are displayed in Lembah Bujang (Erna et.al, 2013). Unfortunately, the actual boundary of shrine area is not clearly determined, thus, only Lembah Bujang and Kompleks Sungai Batu has been gazette in Kuala Muda Local Plan 2020 as a heritage zone.

Spectral reflectance is one of the methods to identify the indexes and selection of threshold value over the selection of shrine properties. Field measurements of surface

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reflectance are widely used in the number of remote sensing analytical approaches such as vegetation canopy reflectance modeling (Rosema et al., 1992). The feasibility of using airborne multispectral remote sensing reflection measurements for discrimination of rock types has recently been investigated (Watson and Rowan, 1971). It measures the amount of energy reflected from the ground area, material or object over different wavelength (Milton, 1987). The measurement of spectral reflectance is made with these spheres by comparing the reflectance signal from the sample to the reflectance beam signal and then making the same comparison with the reflectance standard in place of the shrines sample from the area. The spectral reflectance or reflectance spectrum curve is the plot of the reflectance as a function of wavelength. The reflectance values are independent of time, location, illumination intensity, atmospheric condition, and weather. The aim of this paper is to differentiate the spectral curvatures of shrine properties according to the function of places and age of civilization. The variations of shrine properties value will be affected by the soil and mineralogical differences or particle size effects.

STUDY AREA

Lembah Bujang is located in Merbok, Kedah, between Jerai Mount (1,300 meters high) in the north and Muda River in the south of Kedah, Malaysia. Lembah Bujang holds a significant value as a physical prove of the earliest civilization in the Southeast Asia region. The specific study area is divided into two main areas consist of Lembah Bujang and Kompleks Sungai Batu as shown in Figure 1 and Figure 2.

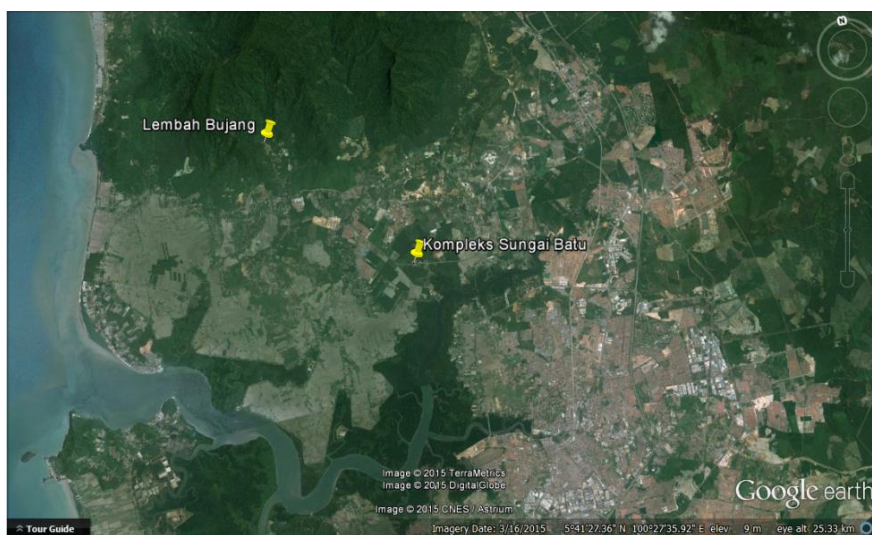


Figure 1: Site Plan of the study area
(Source: Google Earth, 18 October 2015)



Figure 2: Location Map of Lembah Bujang (Left) and Kompleks Sungai Batu (Right)
(Source: Google Earth, 18 October 2015)

METHODOLOGY OF RESEARCH

The purpose of this study is to examine the spectral reflectance of shrines properties in the study area by using the remote sensing device; Spectroradiometer. Clays, granite, literates and iron in a different two study of Lembah Bujang and Kompleks Sungai Batu has been choosing for the reflectance's test. The shrine properties have been recorded according to the function of places and age of civilization where it was located. The specific detail of every shrine properties is shown in Table 1. A conceptual flow diagram shown in Figure 3 will explain the methodology of this study.

Table 1: Location and the samples collection

Location	Shrines properties / Sample	Description of the site	Beginning of Century
Lembah Bujang	Granite and Literates	Lembah Bujang Museum Archaeology	4 th Century (Coedes, 1968)
Sungai Batu	Ancient Clay : 1) Site SB1B 2) Site SB1A	-An ancient brick structure shows a spiritual/ sacred area - Ancient riverside jetty which located near to paleoriver at Sungai Batu	Early of 2 nd century CE Early of 2 nd century CE
	Iron: 1) Site SB2A	-Iron smelting kiln	From 1 st -14 th Century CE

Source: Stephen Chia, Barbara Watson Andiya, 2011

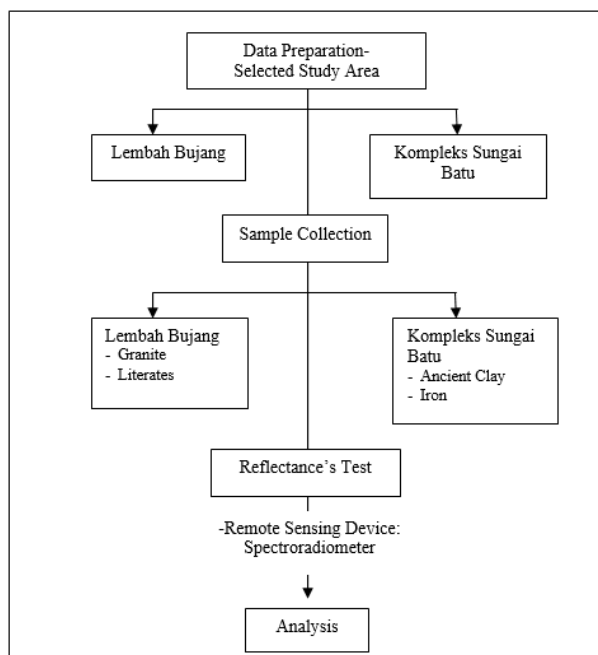


Figure 3: A conceptual flow diagram for Analysis of Shrines Properties using Remote Sensing Approach

METHODS

Field measurements were carried out in two different archaeological areas in Lembah Bujang, Kedah which Lembah Bujang and Kompleks Sungai Batu. Moreover, ground Spectroradiometer measurements were taken: a) over shrines features or materials such as ancient brick, granite and literate depend on site material in order to develop an archaeological spectral signature database and b) at iron smelting kiln area in Kompleks Sungai Batu. The Spectroradiometer instrument that was used to register the spectral signature was GER1500. Figure 4 shows an instrument that may record electromagnetic radiation from a range of 400 nm up to 1000 nm.



Figure 4: Reflectance's test in site SBIA- an ancient jetty structure (ancient brick) dated early of the 2nd century CE using Spectroradiometer

Lembah Bujang

In Lembah Bujang, two different types of material (granite and literate) for ground Spectroradiometer measurements were taken while in each consecutive 10th measurement the calibration spectral on the panel was used in order to minimize sun changes illuminations.

Kompleks Sungai Batu

In Kompleks Sungai Batu, two different types of material (ancient clay and iron) for ground spectroradiometer measurements were taken for Spectroradiometer test. The actual reflectance measurements are usually performed under illuminating and viewing conditions recommended by CIE²: 45°/0°, 0°/45°, *diff*/0° and 0°/*diff* where *diff* stand for diffuse.

ANALYSIS AND FINDING

Reflectance of Lembah Bujang

Most of the construction materials for the temple at Lembah Bujang site were made of clays, river rock (pebbles), mineral literate and granite as display in Figure 5. There are several famous temples had been uncovered in the Lembah Bujang, among of them are the Candi (Temple) Bukit Batu Pahat (Site 8), Candi Kampung Pangkalan Bujang (Site 19, 21 and 22), Candi Estet Sungai Batu (Site 5 and 11/3), Candi Kampung Pendiati (site 16), Candi Kampung Permatang Pasir (site 31) and Candi Kampung Bendang Dalam (site 50). All these temples became evident that the Lembah Bujang was under the Hinduism influenced at that time. However, part of the original structure has been destroyed and cannot be reconstructed from natural disasters such as floods, erosion, World War II or destroyed by local people.



Figure 5: The material used for structure - Candi Batu Pahat and Candi Pendiati at Lembah Bujang

Reflectance's' Analysis of Lembah Bujang

The spectral signature diagram is an easy way to plot target reflectance against wavelength, in a graphical form. Therefore, ground field measurements from archaeological sites may be used in order to create an “archaeological” digital spectral signature. In Lembah Bujang site, different spectral signatures of the materials were taken. The result shows in diagram 1a and 1b Figure 6 the spectra value of granite is higher than literate spectra value.

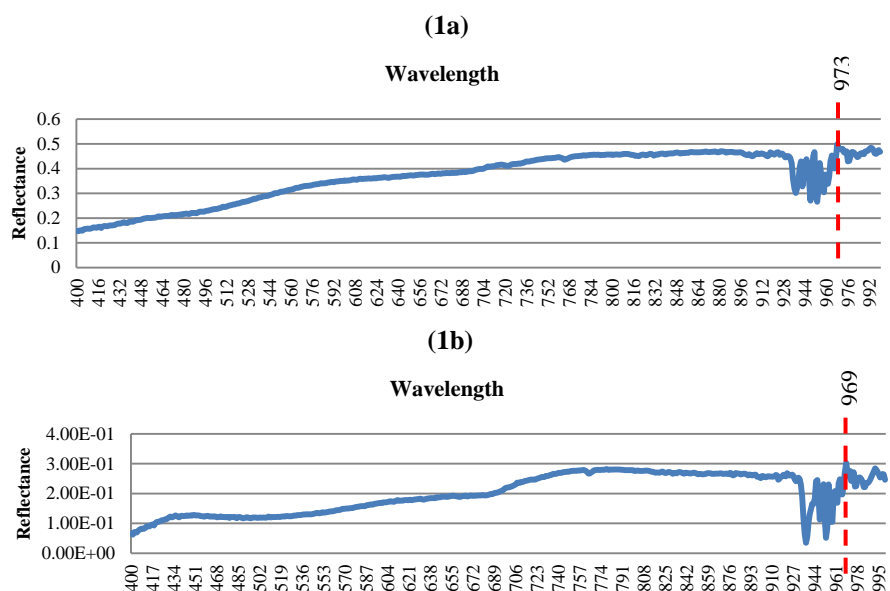


Figure 6 (1a) and (1b): Diagram shows the result of the reflectance test on granite (1a) and Literature (1b)

Kompleks Sungai Batu

The site was divided into two sides, Sungai Batu 1 - SB1 and Sungai Batu - SB2. These both site SB1 and SB2 are situated in a private oil palm estate along new Merbok-Semeling road. It is situated near Sungai Batu, a tributary of Sungai Merbok. (Stephen Chia, 2011). In site SB1, based on 2009- 2010 excavation, 1) an ancient clays structure in Figure 7 shows a spiritual/ sacred area dated to the early 1st- 2nd century CE (site SB1B) and 2) an ancient roofed clay platform, believed to be a jetty which located near to paleo-river at Sungai Batu, dated to early of the 2nd century CE (site SB1A) meanwhile, in site SB2, they found iron smelting industry used from 1st century CE in site SB2A and site SB2C from 8th -11th CE. Besides, they also found an ancient jetty which continuously from site SB1A in site SB2E along paleo-river at Kompleks Sungai Batu.



Figure 7: Monument at site SB1B- A circular clays floor with a square clays structure on top of it and small round clays structure on top of square clays structure.

Sungai Batu- SB1B and SB2A

In site SB1B for instances there a monument such a circular clay floor with a small square clay structure on top of. The reflectance's test is on ancient brick with two different situations- open area and under roof. In Sungai Batu site, same spectral signatures of the materials (ancient clay) were taken but in different condition. On the other hand, in site SB1A, there is believed to be an ancient jetty based on the location of the structure which near to the river bank of the ancient Sungai Batu which established early of 2nd century CE. The reflectance's test is on ancient brick as shows in Figure 9 with two different situations- open area and under roof.



Figure 9: Sample (brick) that used for reflectance's test in site SB1A

Reflectance's' Analysis of Sungai Batu- SB1B

Figure 8(2a) shows that the result of spectra was taken in an open area exposed to the lighting. However (2b) shows the result of spectra was taken under the roof in site SB1B. The result shows the spectra value in an open area is higher than spectra value in under roof.

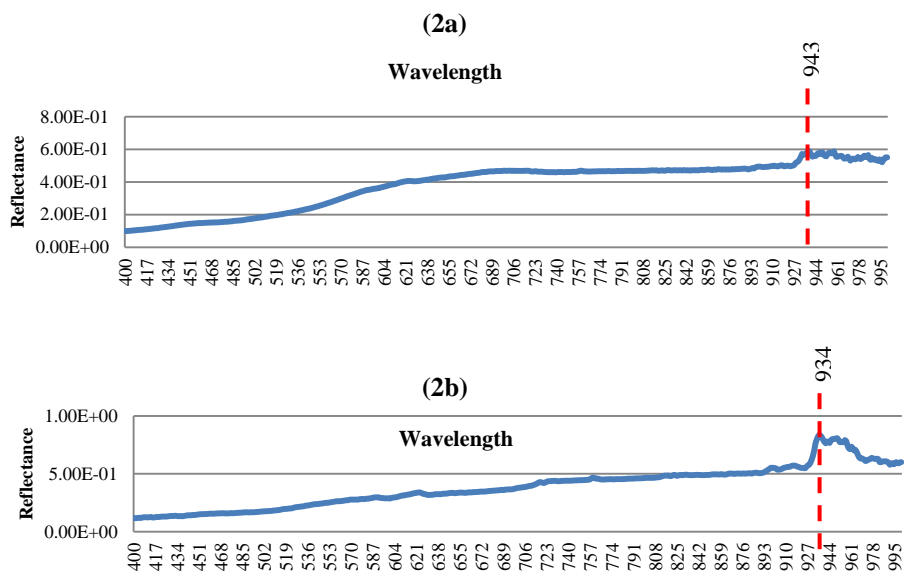


Figure 8 (2a) and (2b): Typical spectral reflectance characteristic for ancient brick in site *SB1B*; an ancient clay structure of a spiritual/ sacred area dated to the early 2nd century CE.

Reflectance's' Analysis of Sungai Batu- SB1A

Figure 10(3a) shows that the result of spectra was taken in the open area which exposed by the lighting, however (3b) shows the result of spectra was taken under the roof in site SB1A. The result shows the spectra value in an open area is higher than spectra value in under roof.

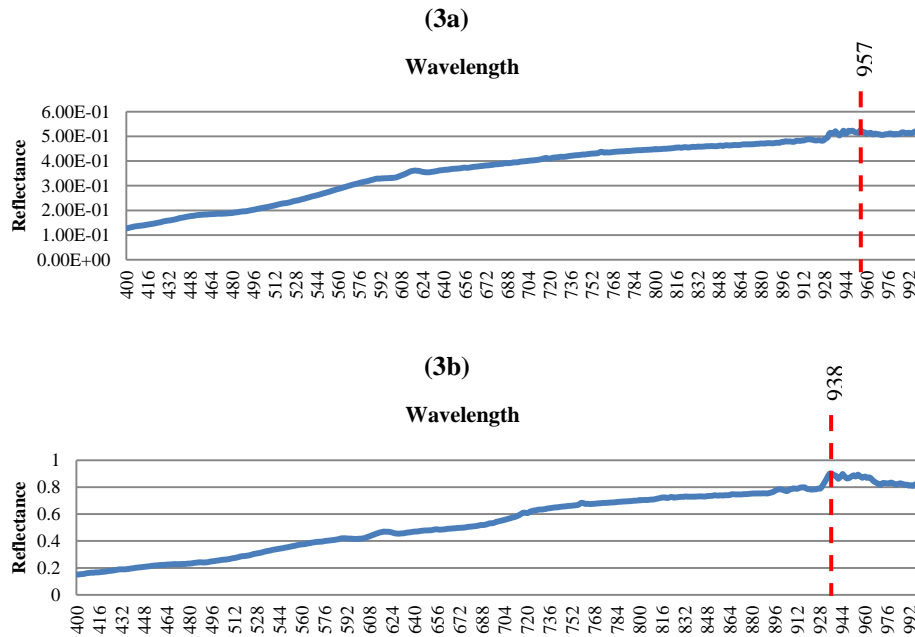


Figure 10 (3a) and (3b): Typical spectral reflectance characteristic for ancient brick in site *SB1A* - an ancient jetty that believed established early of the 2nd century CE

Sungai Batu- SB2A

In site SB2A, the reflectance's test is of clay and iron (iron smelting kiln) as shown in Figure 11. In this site, CGAR was found an iron smelting industry structure used from 1st century CE. Besides, thousands of pieces of iron ore and iron slag, there are also a large number of clay pipes which used to blow air into the iron smelting furnaces. The latest findings from PPGA is ancient jetty in site SB2 namely SB2E which continuously from the ancient jetty at SB1A.



Figure 11: Sample; Iron that used for reflectance's test in site SB2A

Reflectance's' Analysis of Sungai Batu- SB2A

In site SB2A different spectral signatures of the materials were taken which ancient clay and iron in the same area; iron smelting kiln site from 1 Century CE. The result shows in diagram 4a and 4b Figure12, the spectra value of iron is lower than spectra value of ancient brick in the same area.

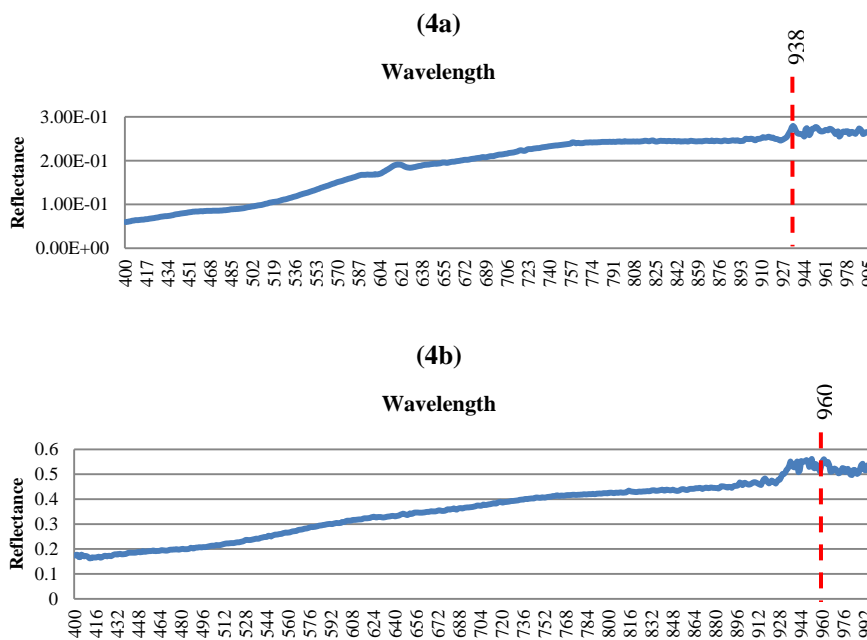


Figure 12 (4a) and (4b): Typical spectral reflectance characteristic for *iron* in site SB2A - iron smelting kiln used from 1st century CE

Reflectance's' Analysis of Sungai Batu- SB2E

In site SB2E as display in Figure 13, the result of reflectance's test over sample ancient brick as shown in Figure 14.



Figure 13: the ancient clay that used for reflectance's test in site SB2E- ancient jetty continuously from ancient jetty at site SB1A

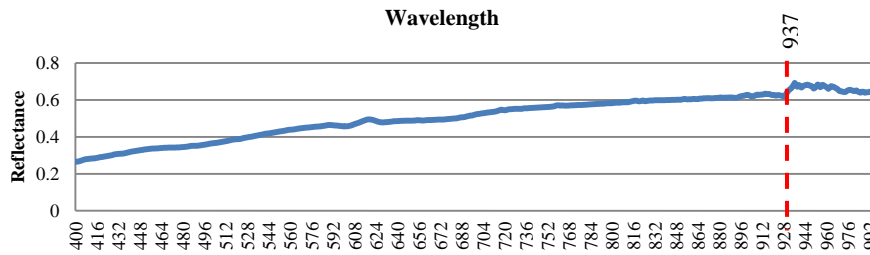


Figure 14: Typical spectral reflectance characteristic for ancient brick in site *SB2E*

RESULT

Figure 15 shows the comparison of the spectra value after average all the wavelength index between iron, clay, and granite in two different locations of Lembah Bujang and Kompleks Sungai Batu. The result shows that ancient brick to be more reflective than granite and iron.

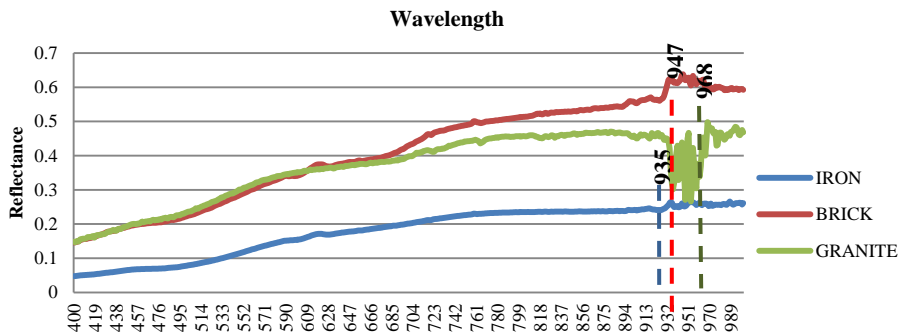


Figure 15: Comparison Reflectance Results between Iron, Ancient Brick and Granite

CONCLUSION

The study found that the reading of wavelength in all samples in two different location are 900nm and above. Here we can assume that all the shrines properties magnitude length is situated in 700–1400 nm-wavelength of near-infrared radiation. Secondly, there are possible reading errors may arise due to the inability of the measuring the samples to properly compare to the reflectance curved and the flat surface either due to the difference in the relative area or by the sample properties laid by the ground and not be clean before the test or due to inconsistent lighting such as vegetations or weather condition when the sample is taken.

Moreover, it was proved that Spectroradiometer measurements can be used as an alternative approach in order to identify archaeological properties since they can provide accurate spectral signatures for a wide spectral region. Anomalies of the shrines properties spectral signatures, for instance, can be recorded in detail and contribute to the

construction of a predictive archaeological model in the future. Furthermore, this study is efficient for any potential researcher to combine this spectral signature and satellite imagery in order to detect archaeological relics in the area because it highlights the high correlation of spectral response of archaeological material and local geological formations in the area.

ACKNOWLEDGEMENT

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THE EVOLVEMENT OF BRAND IDENTITY OF LANGKAWI ISLAND, MALAYSIA

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Abstract

The purpose of this paper is to investigate the brand identity development efforts of Langkawi Island as one of the most prominent and well-guarded tourism destinations in Malaysia. It will be viewed from the historical perspectives for the last 35 years since the 1980s until the present time as to how this involvement influences the formation of its brand identity and later, the existing destination image. Based on in-depth interviews with eleven different levels of managers of separate divisions for destination management organizations (DMOs) in Langkawi Island, Malaysia, theoretically, the findings provide an opportunity to expand the knowledge of destination brand identity development and the involvement of DMOs in influencing image making over time. Practically, the findings indicate three key important antecedents of brand identity development efforts related to: (1) the effects from multiple positioning themes and slogans, (2) the important of brand coordination, and (3) brand leadership issue. These empirical findings provide new insights into enhancing the theoretical aspect of managing a destination brand, including its close relationship with issues faced by destination marketing organizations in managing destination branding strategy. Thus, using the case study of Langkawi Island, the context of multiple identities or image fragmentation is important to be understood due to the different perceived ideas on how the image should be projected according to stakeholders and market segmentation.

Keyword: Brand identity development, Langkawi, Malaysia, stakeholders, branding slogans, DMOs

INTRODUCTION

Destination brand identity is one of the important core concepts that have been discussed in destination branding literature (e.g. Bregoli 2012; Mak 2011; Saraniemi 2011; Wheeler, Frost, & Weiler 2011). Mak (2011) has explored destination brand identity from the DMO's industry partners, while Saraniemi (2011) investigates the destination brand building activities by the National Tourism Organization (NTO), drawing from the identity based branding literature. Wheeler et al. (2011) have indicated that a destination brand developed could be incongruent with the destination product offerings and their identity. They also point out that internal stakeholders such as tourism operators and local communities may perceive a destination brand that does not conform to the values and its

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identity if the brand is enforced by the authority. In short, brand identity development is important as it represents the brand from a supply perspective.

Most of the destination branding studies discussed and examined the brand from the demand perspective or visitors to the destination (García, Gómez, & Molina 2012; Konecnik & Go 2008). From the branding literature, examining the brand from the demand side is defined as a brand image and from the supply side is as a brand identity. Both perspectives should be taken into account to get a holistic view of the success of destination branding strategy (Bregoli 2012; Saraniemi 2010). From a general marketing point of view, brand identity and brand image are related, but they are two different concepts (Lin, Pearson, & Cai 2010). In short, the key difference between these two concepts is that identity comes from the company whereas the image is an individual's perception of a particular brand (Nandan, 2005).

Although destination branding has been one of the topics that has gained attention in destination management research, the development process of destination identity or brand identity has yet to be adequately addressed, particularly in a tourism destination of a developing country. More studies are observed in the context of destination identity and its sense of place in relation to destination brand identity development (e.g. Campelo, Aitken, Thyne, & Gnoth 2013; Konecnik & Go 2008; Konecnik Ruzzier & de Chernatony 2013; Wheeler, Frost, & Weiler 2011). However, fewer studies are reported in terms of tracking the evolvement of destination brand identity over a period of time due to the development of the tourism industry of a particular area. This paper examines the brand identity development efforts from a historical perspective of the way a destination is positioned using multiple branding slogans or positioning themes to be promoted as a competitive tourism destination. Using Langkawi Island, one of the most prominent and well-guarded tourism destinations in Malaysia as a study context, multiple documents such as official reports and archival materials were analyzed to examine how brand identity is changed to attract multiple market segmentations for a period of over three decades. This study also performed in-depth interviews with various key officers of a destination development authority, a National Tourism Organization and with a destination local municipal council to get their perspective on the brand identity development efforts that seem to have changed due to more tourism products being introduced to cater to multiple market segmentations.

The significant involvements of various policymakers such as destination management organizations, (DMOs), local city councils and national tourism organizations (NTOs) in destination's tourism success, particularly in branding strategy, are vastly discussed in the destination branding literature (e.g. Bornhorst, Ritchie, & Sheehan 2010; Pike 2007; Volgger & Pechlaner 2014). To remain competitive in the tourism marketplace, many destinations have established a DMO to provide leadership in managing tourist destination (Bornhorst, Ritchie, & Sheehan 2010; Steven Pike & Page 2014). One of the important roles performed by DMOs is to brand a destination as unique and attractive to attract more visitors to the area. Therefore, DMOs have increased the amount of investment for branding activities and the efforts are observed since the 1990s (Pike 2007). DMOs are recognized as the principal of branding strategists for a destination. In branding a destination, DMOs are in charge of crafting the overall brand strategy. In the literature, the term DMO refers either to destination marketing organization or destination management organization and is used interchangeably to

highlight the multiple responsibilities of such organizations. Normally, lead DMOs can be nations, states, local governments or specific tourism entities such as a Convention and Visitors Bureau (Zavattaro, Daspit, & Adams 2015).

However, in Malaysia, the term DMO mainly refers to either National Tourism Organization (NTO) or a development authority where specifically in the case of Langkawi Island, it is a destination development authority and National Tourism Organization (Tourism Malaysia). Both organizations are funded by the federal government. Local government authorities also have their role in supporting the tourism industry, but they are not directly involved in destination branding strategy. In the case of Langkawi, in order to develop the island as a prime international tourism destination, the government has established Langkawi Development Authority in the year 1990. The primary role of the agency is to plan, stimulate and coordinate of the overall development of the island where the locals may reap the maximum benefits from all the tourism activities and development (Samat 2010). The agency is also responsible in positioning the island as one of the top tourism destinations globally through its various tourism product offerings and identifying market segmentations.

Brands as described in the literature are supposed to be a clear and distinct image which differentiates them from the competitors (Baker & Cameron 2008). Similarly, in destination image literature, branding efforts should be framed within a clear image strategy (Gartner 1993). Pike (2010) also mentions that a destination should have a clear identity to remain competitive. However, as argued by Ren & Blichfeldt (2011), the literature does not provide much explanation towards the meaning of 'clear identity or a clear image strategy'. Therefore, lack of clear identity or having multiple identities or images as perceived by both from internal stakeholder's perspective or the visitors do not necessarily mean something negative. These different views are to be expected and acknowledged. As long as the destination can deliver what it promises, it is acceptable to have multiple projected images.

Slogans and positioning themes as part of identity development

Having a slogan is part of the branding efforts to promote a destination. Most destinations use a branding slogan as part of their brand positioning strategy (Pike, 2005). In order to associate between the brand identity desired by DMOs and the actual brand image held in the market, destinations provide various slogans as one to differentiate from others. A slogan is defined as a short phrase that is easy to remember and is used to convey the values of a destination to the visitors for them to experience (Rehan 2014). Slogan is supposed to be attractive, commercialized and catchy to be associated with a brand. A destination is identified through a slogan and very often a powerful image is projected by developing a slogan that visitors can easily remember such as 'I love NY', 'Malaysia Truly Asia' and 'Amazing Thailand'. The main purpose of a slogan is to communicate key descriptive features of a place such as a tourism destination or a country (Supphellen 2002). From the general branding perspective, slogans are part of the identity elements and used to differentiate a brand (Keller 2013). Slogans are powerful branding tools because, like brand names, they are an extremely efficient, shorthand means to build brand equity (Keller 2013: 158). Similarly, in branding a destination, slogan is used to create brand awareness and to reinforce the brand positioning. However, developing an effective slogan or tagline for a destination is much more complicated than for consumer

and corporate brands (Supphellen, 2002). As claimed by Pike (2012), DMOs experience several challenges in developing meaningful positioning themes that represent the needs of diverse markets as well as the range and diversity of local attractions and product offerings.

Brand coordination

Branding a destination is mostly coordinated by destination management organizations, which are normally administered and funded by a government authority. It is recognized in the literature that coordination among different stakeholders is one of the important factors determining the success of a destination brand (Bregoli 2012). However, internal coordination between departments, divisions or unit within DMO is also critical in building and implementing a successful branding strategy (Hankinson 2007). Hankinson argued that developing brand identity begins with the DMO from the top management of the organization to the entire staff members. Subsequently, the brand identity is extended and coordinated with other partner organizations.

Brand leadership issues

Brand leadership is one of the important guiding principles for destination brands. Based on the corporate branding theories, Hankinson (2007) argues that a strong, visionary leadership is critical to brand a destination efficiently. Managing and developing brand identity is a process performed by the DMO whereby the organization as whole decides a vision and strategy for the brand creation (Kavaratzis, 2009). As suggested by Kavaratzis (2009), the DMO has to inculcate the brand culture of the organization, focusing on the internal brand identity development among its entire staff members first. The next step is to promote the brand with other organizations in order to build alliances and partnerships as part of the external brand identity development. The last step is to communicate the brand promise and to deliver the brand experience with the multiple stakeholders that are involved in the branding process.

METHODOLOGY

In order to investigate the brand identity development efforts of Langkawi Island and its image projected over a period of 35 years (1980-2015), it was decided to conduct field interviews with a sample of senior key persons from different organizations operating on the island. The data were gathered by interviewing seven different division managers of the destination planning and development authority including the CEO, three different level managers of the National Tourism Organization and the president of the local municipal council. All participants were selected based on their experience, knowledge and their roles in influencing the brand identity developments of Langkawi Island from DMO's perspective. A total of twelve participants were contacted to participate in the study. Official letters were sent through emails to senior managers in charge of tourism, asking the person and other related officers to participate in the study. A separate letter was sent to the CEO of the development authority through his personal assistant also by email for the same purpose. A follow up phone call was made a week after the email was sent to reconfirm the interviews which would take place in Langkawi. Details of the participants representing respective organizations with different levels of managerial positions and roles are presented in Table 1.

As mentioned by Saraniemi (2010), the data collected from interviews with the selected respondents may not represent the actual realities of the events or phenomenon as in every historical research. Therefore, this study made efforts to cross-check and verify several times against secondary data of multiple archive reports published by the relevant authorities such as Visitor Destination Plan and other development plans and reports during the years (Saraniemi, 2010).

Table 1: Details of individuals interviewed representing different levels of management and divisions

Organization/Individuals with different levels of managerial positions and divisions
<p>Destination Development Authority</p> <ol style="list-style-type: none"> 1. CEO 2. Manager (Tourism Division) 3. Senior Assistant Manager (Tourism Division) 4. Assistant Manager (Event and Promotion) 5. Senior Assistant Manager (Geopark and Conservation Division) 6. Assistant Manager (Development and Planning Division) 7. Head Assistant Manager (Delivery Management Office)
<p>National Tourism Organization</p> <ol style="list-style-type: none"> 8. Assistant Director Promotional Support Division 9. Manager of Tourist Destination Information Center 10. Assistant Manager of Tourism Information Center
<p>Destination Local Council</p> <ol style="list-style-type: none"> 11. President of Municipal Council

To explain how the destination identity developments evolved over the period of 35 years (1980-2015), a series of questions were addressed regarding the multiple taglines or themes used to project the image of the destination during that period of time, including how managers: 1) perceive the changes of different slogans, 2) identify the core values or actual identity of the destination, 3) engage with other internal stakeholders such as tourism operators and local community, and 4) react to change of leadership. The examples of the questions used were as follows: “Can you tell me about Langkawi’s identity and its core values?”; “How would you engage with other important stakeholders in creating the brand identity?”; “Why were there different slogans or taglines used to represent Langkawi over the period of 35 years?” These questions were asked to most of the respondents to obtain their views on the evolvement of the destination identity.

The researcher used semi-structured questionnaire to guide the interviews. Nine interviews were tape recorded. Two of the respondents refused the interview to be recorded where the researcher had to resort to writing notes during the session. The interviews were conducted separately over the period of seven months starting from October 2014 until April 2015 due to different schedules of the managers and their time constraints. It was challenging to interview some of the managers and the CEO as they were always on official trips and attending multiple events and functions. The interviews took times varying from about 15 to 60 minutes and they were transcribed immediately

after each interview to have a clear understanding of the studied case (Okumus, Altinay, & Roper 2007). The researcher read all the transcribed documents several times and examined the patterns that emerged. All the transcriptions were coded accordingly. The researcher focused on the patterns identified that relate to the evolvement of destination identity development efforts from different periods based on the views from managers of the destination development authority, the national tourism organization and the president of the municipal council. To provide a comprehensive picture of destination brand development efforts of Langkawi over the last 35 years, besides in-depth interviews data, the researcher also referred to other sources of information including websites and destination official portal, promotional materials, official annual reports and other related documents.

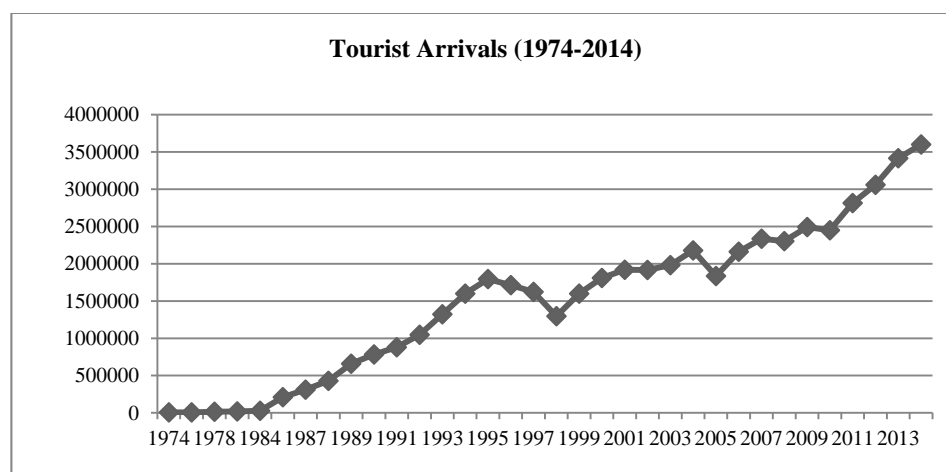


Figure 1: Increasing Tourist Arrivals to Langkawi Island (1974-2014)

Source: Langkawi Development Authority (LADA) (2013) and Langkawi Development Authority (LADA) (2015, online)

RESULTS AND DISCUSSIONS

Multiple taglines and positioning themes

It was discovered that between 1980 and 2015, Langkawi Island had many positioning themes or taglines introduced to market the island as a tourism destination. All participants agreed that over a period of 35 years from 1980-2015, Langkawi has reinforced multiple images through different themes or slogans including the 'Isles of Legends', 'Duty Free Islands', '99 Magical Islands', 'Tourism City', 'The Jewel of Kedah', 'Langkawi Global Geopark' and 'Naturally Langkawi'. For example, according to a CEO of Langkawi Development Authority:

..There are many taglines... when we talk about branding and marketing, there must be a tagline, and the same observation was made by the consultant appointed by the government.

I mean 99 islands, and then 99 Magical islands, the Jewel of Kedah, the Jewel of Kedah is not the commercial branding, Langkawi the Isle of Legends. So we need the commercial branding.

However, not all of the taglines or slogans really represent the official branding slogans of the island. Some of the taglines were simply used to introduce and position the island on the global tourism map. As explained by a manager of tourism division, the official branding of the island started following the release of the Langkawi Tourism Blueprint in 2011 by the Prime Minister Najib Razak. In year 2012, the island embarked on the official branding campaign under the theme 'Naturally Langkawi'. She emphasized on the importance of the blueprint to Langkawi's tourism industry:

The blueprint is the plan that was prepared by the EPU(Economic Planning Unit) exclusively to revive the tourism industry unlike other previous Langkawi plans which stressed more on planning and developing the island.

All the labels used seem to work in attracting different markets to the island. Tourist arrivals have grown substantially over that period of time as shown in Figure 1. Figure 1 illustrates the upwards trend of tourists arrivals starting from 1974 until 2014. As depicted in Figure 1, the total number of tourist arrivals depends on the global economic conditions and external global environment as the figures fluctuate due to events such as Asian financial and economic crisis (1996-1998), terrorism (Bali bombings in 2002) and natural disaster (tsunami event in 2004). In 2013, Langkawi recorded total tourist receipt of approximately MYR\$4.5 billion from the arrival of 3.4 million tourists representing domestic and international visitors (LADA, 2013). In the same year, Malaysia's tourist receipt was recorded at MYR\$65.44 billion and Langkawi's tourist receipt alone represented 7% of the total tourist receipts of the whole country. Therefore, the tourism industry now is the biggest industry on the island and the local people appear to enjoy the economic benefits gained from the industry. Majority of the local people are engaged in the tourism industry, working in the hotels, operating resorts and chalets as well as managing or guiding tours.

In analyzing the Langkawi destination identity, it is found that Langkawi holds different identities to different market segmentations. According to one of the senior managers of tourism division for Langkawi development authority, Langkawi is perceived with different identities and images by different markets:

Event organizers want to have events here. The local people want to come here for shopping, the foreign tourists come here to enjoy the natural beauty, natural landscapes, beaches and soft adventures activities such as walking in the jungle trail, birding and so on.

The same sentiment was echoed by a manager of tourist information centre when making some observation on the island's multiple market segmentations:

Domestic market is important for the island. Most of them come to the island for shopping activities because of the island's duty free status. The duty free status is

appealing to the market. Most hotels around Kuah town survive because of the domestic market.

The various taglines introduced by the authority appear to relate to different target markets that keep on changing over time. In the 80s, for example, the tagline used was 'Langkawi, the Isle of Legends' and in the 90s, the tagline changed to 'Langkawi – 99 Magical Islands in the Sun'. In the mid-20s, the tagline changed again to Langkawi Global Geopark and in year 2013, the authority released its official branding strategy of the island under the official tagline of 'Naturally Langkawi'. When asked why the taglines are changing, a senior manager who has been on the island for over ten years and working with the development authority responded:

There are different tourist market segments going to Langkawi. There are many markets from different countries. For example, European tourists, they love nature and therefore we focus on nature, rainforests and mangroves. But if the tourists are from China, they don't go for nature, they like beaches. So we have to focus on beaches. That is why we use 99 Islands in the sun; the element of sun is there. The Jewel of Kedah is for the local domestic tourists, those local mass tourists. The duty free Island actually attracts the local domestic tourists...

These comments narrate to the destination brand identity development efforts where image projected by the authority varies based on different target markets. For the last 35 years from 1980-2015, Langkawi Island has been positioned with different themes and slogans to reflect the changing markets over time. However, some of the taglines did not come directly from the agency office but from the previous elected state government, which was consented by the Royal Sultan of Kedah (Langkawi the Jewel of Kedah), and the Ministry of Local Government (Langkawi Tourism City). When asked about how and why Langkawi used different branding slogans over that period of time, one of the managers mentioned:

Langkawi Tourism City is a status awarded by Ministry of Local Government to elevate the status of Langkawi as a modern tourism city especially for the domestic market. Once you get city status, there will be more funds directed from the government to further develop Langkawi....Langkawi the Jewel of Kedah was proposed by the previous elected Kedah opposition party and it was consented by the Sultan of Kedah to show that Langkawi is still part of Kedah and long before that it is 99 Magical Islands.

The empirical evidence of this study indicates that destination identity development is influenced by different stakeholders' involvements, which are politically related. Granting Langkawi as a tourism city and being recognized by the Ministry of Local government as a tourism city had provided access for the destination to get more funding to develop the island's tourism. As a result, more funds are channelled to the developing authority in improving local infrastructures such as road conditions and enhancing other tourism infrastructures and therefore modernizing the island to cater to international tourists. The slogan 'Langkawi the Jewel of Kedah' was mooted by the

previous elected state government to indicate that Langkawi is still part of Kedah and not completely owned by the federal government. Therefore, the purpose of branding is not only to attract more visitors to the island but also to get more funding from the government and potential investors to further develop the island. At the same time, the branding slogan such as Langkawi, The Jewel of Kedah is supposed to create a sense of belonging and sense of ownership among the local residents towards the Langkawi brand.

Brand coordination is one of the critical issues that are raised by the development authority managers and those officers from Tourism Information Centre. In the case of Langkawi, there is empirical evidence observed in terms of brand coordination within different divisions among a particular development authority as well as coordination with the other tourism organizations. There are some efforts by the authority to create brand awareness among the local community and tourism operators. However, local people's attitude towards various projected identities by the authority appears to be indifferent towards the branding strategy. According to a manager of one of the divisions, the locals are not significantly involved in the efforts performed by the authority in regards to the branding efforts of the island:

There is little involvement from the local people in our branding strategy. But the only thing that they want is they enjoy development, if they look back at themselves where they were before and where they are now, I think they are happy.

A CEO of the Authority concurred with the observation made by his manager in regards to little involvement from the local people, where he feels that local people need time to adapt with the island's current branding strategy due to their lack of knowledge and concerns towards the brand:

I know it takes time, because, well, we have to face it, do you think they (local people) know about marketing? About branding? They have little knowledge in or even know nothing about marketing and branding. To them, as long as more tourists are coming, it is alright.

However, the CEO agreed that community acceptance towards the official brand is important and the authority is making efforts so that the brand will be accepted by the local people over time when he stated:

We try our level best so that this brand will be accepted, there are some people who are very sentimental with this, so, it will take a while, before they will accept this new brand.

Some of managers from different divisions of the DMO have little understanding what the brand is and why the brand is important. As a result, this little coordination contributes to lack of understanding and confusion among managers towards the brand promise. For example, one of the managers associated with the Geopark mentioned that she has little understanding towards the authority's branding strategy:

I don't know how to comment about Langkawi's branding. Well, Langkawi Geopark is not really a brand, it is just a concept. However, it becomes a brand because Langkawi Global Geopark is recognized by the UNESCO. Geopark becomes marketable because of its recognition from the world body. That is what I have been told. I have no idea what a brand is, really. I am sorry.

On the contrary, the other manager from a different division mentioned that Langkawi Geopark is really a sellable brand:

Currently, we are using Langkawi Global Geopark as a brand and Tourism Malaysia also uses it because it is a sellable brand, UNESCO Global Geopark. UNESCO is an international brand, so we definitely have the international platform to be seen in the tourism industry. We need to be seen and be present in this industry.

Based on this data, apparently, each division among the same organization has different levels of understanding towards interpreting the brand where in this case is the Langkawi Global Geopark brand. Some divisions may have in-depth knowledge about the projected brand identity and its values while the others may not.

According to one of the managers in charge of planning and development division, there are on-going efforts from the authority to collaborate with the other agencies in revising the local plan to align with the current authority's projected identity of the island as an eco-tourism destination. For example, the agency and Langkawi local authority (MPL) are currently reviewing the local plan and proposing solutions to develop the island in a sustainable way.

Leadership skills among the appointed CEO or General Manager of the development authority play important roles in influencing the destination brand identity efforts over the last 35 years of tourism development on the island. Since the agency was established in 1990, there have been six changes to its general managerial position, with a new CEO, a retired senior government officer appointed in year 2012 until the present time. All the General Managers or CEO of the agency were appointed by the government among government senior officers who previously were attached to different government agencies and ministry such as from administrative and diplomatic offices, finance, district, mineral and land offices. Each CEO has different leadership styles and their enthusiasm towards developing Langkawi as a destination brands varies. Every time a new GM is appointed, there will be changes in the way the agency is managed. Some CEOs were enthusiastic in developing Langkawi and came up with different ideas to advance the tourism industry while some were too focused on bureaucratic procedures to the extent that it limits the island's overall tourism development.

CONCLUSION

In the case of Langkawi Island, the role of DMO in the form of development authority is of utmost importance. The government's traditional top-down approach through its various agencies such as its Development Authority and National Tourism Organization (NTO) has influenced much of the brand identity development efforts of Langkawi over the last 35 years from 1980 until 2015. Since most of the tourism development could only

be done by the government, Langkawi through its Development Authority has been positioned with different themes and slogans to attract different market segmentations but with little consultation from its wider stakeholders (e.g. tourism operators, local community, etc). However, given the increasing number of tourist arrival over that period of time, the strategy of multiple projected images seems to be working well with Langkawi.

For the last 35 years, the development authority is in charge of implementing various tourism projects as well as constructing tourism facilities and attractions that cater to both local and foreign tourists the island. This traditional approach practiced by DMO in emphasizing brand identity development efforts on projected multiple images towards visitors alone could be less efficient in enhancing the destination brand values (García, Gómez, & Molina 2012). It could be successful in attracting more tourists but eventually, the DMO may end up losing support from the other important stakeholders such as business operators and local community. In the case of Langkawi, it is time for the DMO to rethink its branding strategy by engaging more dialogues with the stakeholders and find ways to connect with the local people effectively. At the same time, considering that the authority is pursuing destination branding strategy to differentiate the island from the others aggressively, it is important that they first really understand the brand values. Branding strategy is a complicated process because it is involved with different stakeholders with diverse interests. Given the important roles of widest stakeholders in supporting any brand promoted by the DMO, striking an acceptable balance between the demand and supply approach in branding strategy is very critical. The process of constructing a strong brand starts with the DMO and is later extended to other related partner organizations (Hankinson 2007). Therefore, it is critical that all employees from all divisions of DMO to clearly understand the projected identities and the brand values that the organization attempts to convey.

Therefore, more concerted branding efforts are needed to position a destination to be competitive. It is suggested for DMO to intensify their efforts in engaging with the wider stakeholders to make a brand a success. Supports from different stakeholders are important to deliver the brand promise. Having slogans or interesting labels are important for branding but what is most important is whether a destination can deliver the promises or values or not. A bottom-up approach that promotes engagement with a range of different stakeholders may provide strengths to the brand identity development, which include public and private partnership (Woodland & Acott 2007). At the same time, DMO has to inculcate a brand culture among its employees across different divisions by educating them through workshops and training related to destination brand (Hankinson 2007).

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A THEORETICAL OVERVIEW OF ROAD HUMP EFFECTS ON TRAFFIC SPEED IN RESIDENTIAL ENVIRONMENTS

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Abstract

This paper is part of an ongoing study to analyse the effectiveness of road humps as a traffic calming measure in improving the residential living environment. A review was conducted on various literatures concerning the effects of road humps on vehicle speeds, particularly in residential areas. The major findings from the literatures are that the vehicles' operating speeds are affected by the hump design and spacing in between humps. An incorrect hump profile will also potentially result in passenger discomfort and vehicle damage. Public perceptions also agreed that road humps are effective in reducing vehicle speeds. More studies should link field study results with residents' perceptions particularly in Malaysia, while considering the effect of road geometrics and other devices possibly impacting vehicle speeds along selected roads. Further research also needs to be done to test the effectiveness of current schemes in Malaysian residential areas, as many are on an ad-hoc basis.

Keyword: Road humps, Traffic calming, Traffic speed, Living environment, Malaysia

INTRODUCTION

In Malaysia, the substantial increase in the rate of motorization, with a growth rate averaging 8.16% for Kuala Lumpur and 6.73% for Malaysia from 2000 to 2004 has caused serious concerns on the road infrastructure (Kadar Hamsa, 2009). This increasing rate of motorization has subsequently led to concerns on traffic congestion, environmental pollution and road safety. In addition, the rising motorization rate has also resulted in increased road infrastructure. Some of the additional road infrastructure may be constructed in close proximity to residential areas; together with the increase in the number of on-road vehicles, this can raise more concerns on the residential living environment in terms of traffic volume, speed and noise. The occurrence of excessive vehicle speeds is found to be relatively common along local and collector roads with low speed limits (Dinh and Kubota, 2013; Islam et al., 2014), leading to concerns where increased traffic volume and speed have caused the deterioration of living conditions (Litman, 1999, Rahman et al., 2005). These common occurrences of increased vehicle speeds have also been found to cause an increase in accident severity, where the probability of pedestrians receiving fatal injuries when hit by a car is 3.5% at 15 mph

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(24.1 km/h), 37% at 30 mph (48 km/h) and increases to 83% at 44 mph (70.8 km/h) (Limpert, 1994 as cited by Abdul Manan and Hoong, 2009).

As one of the traffic calming measures, road humps have helped to significantly reduce the speed of the moving vehicles especially along residential roads. Due to its largely positive impact in its ability to considerably reduce vehicle speed, its importance has been growing over the years in improving the living environment of the residential areas. However, a prevailing issue in Malaysia is that the Malaysian Traffic Calming Guidelines has not been adhered to in the installation of various existing traffic calming schemes in Malaysian residential areas. This may lead to various issues such as a lack of standardization in dimensions, unsuitable locations, user confusion due to improper construction and no effect on driver behaviour (Abdul Manan and Hoong, 2009). As part of an ongoing research to analyse the effects of road humps in improving the living environment, the objective of this study was to understand the prevailing theories concerning the effects of road humps on traffic speed and also identify the research gaps for the ongoing research to improve upon.

METHODOLOGY

Being a literature review, the method employed is a desk study identifying the relevant literature and any research gaps that the ongoing research can improve upon. The hump design and spacing were selected as the variables explaining the road hump effects on traffic speed. This is due to Parkhill et al. (2009) and Sundo and Diaz (2011) concluding that the hump spacing is a good variable to explain the maximum speed selection of drivers, thus affecting the effectiveness of a road hump in controlling vehicle speeds. Parkhill et al. (2009) and Antic et al. (2013) also listed the hump profile as another factor affecting the effectiveness of a road hump, with the explanation that an incorrect hump profile would potentially cause passenger discomfort and reduce the effectiveness of a hump in encouraging drivers to slow down. In addition, Daniel (2012) proved that hump width was also a factor by finding that the device operating speed is also affected by hump width to road width ratios. Thus the criteria for selecting the case studies were that they were based on road hump design and spacing, and that the speeds were found to be reduced within the 35km/h limit. The reason for the criteria is that 35km/h is the general speed limit along a traffic-calmed residential road in Malaysian urban areas (Abdul Manan and Hoong, 2009).

TRAFFIC CALMING IN MALAYSIA

Traffic calming was classified by the Malaysian Highway Planning Unit (HPU) into two categories, which are as below (Abdul Manan and Hoong, 2009):

- 1) Vertical Measures: Influences drivers' speed through vertical deflections of vehicles passing over the device.
- 2) Horizontal Measures: Influences drivers' speed through lateral deflections of vehicles navigating the device.

The speed hump is categorized under vertical measures, along with other devices such as transverse bars, speed tables and textured pavements. Vertical measures were stated by the Highway Planning Unit as being more effective in reducing vehicle speeds, in comparison to horizontal measures (Abdul Manan and Hoong, 2009). Thus this study

is focused on speed humps, as the speed hump is the most commonly found vertical measure in Malaysian residential areas. The Malaysian road hump design specifications, as derived from Malaysian Ministry of Road Works (2012) are as per Table 1 below.

Table 1: Malaysian Road Hump Specifications

Material Used	Dimension
Asphaltic Premix Wearing Course	a) Flat-Top Hump Height: 75 mm -100 mm Width: 2.5 m - 4 m
	b) Round-Top Hump Height: 50 mm – 100 mm Width: 3.7 m- 4 m
	c) Sinusoidal Hump Height: 75 mm -100 mm Width: 3.8 m-4 m

CONDITIONS WARRANTING INSTALLATIONS OF ROAD HUMPS

The Malaysian Ministry of Road Works (2012) defined road humps as a raised area of a pavement, which Berthod (2011) stated causes discomfort due to the vertical displacement created when a vehicle is navigated over the raised area. This influences the drivers to reduce the speed. Hump profiles can be circular, parabolic, sinusoidal or flat-topped (Abdul Manan and Hoong, 2009). The difference between road hump and road bump is in the length and slope; a hump's slope is more gradual while its length is greater than the wheelbase of a vehicle (Berthod, 2011).

According to the Malaysian Ministry of Road Works (2012), the conditions that warrant the installation of road humps are as below:

- 1) Vehicle Speed: Between 30km/h to 60km/h
- 2) Road Hierarchy: District Road, Residential Road, Access Road, Rural Road
- 3) Road Geometry: 2-way and 2-lane roads with no kerbs.

Nevertheless, there are also conditions for which the installation of road humps would be generally deemed unsuitable. The Malaysian Ministry of Road Works (2012) further explained that the conditions that are deemed unsuitable for speed hump installation are as follows:

- 1) Water retentive locations
- 2) Main routes for emergency vehicles
- 3) Locations at road corners, and
- 4) Federal and State Roads.

Other studies also noted that it is generally unsuitable to install road humps along bus routes, as humps may cause discomfort to the passengers and delay in the travel times (O' Flaherty, 1997; Parkhill et al., 2009), though this is not mentioned by the Malaysian Highway Planning Unit. A possible explanation is that the existing bus routes penetrate into the residential areas, in which traffic calming devices may still be required for the benefit of residents.

EFFECTS OF ROAD HUMP ON TRAFFIC SPEEDS

Various studies on the effects of road humps have concluded that the road hump is an effective measure in significantly reducing the 85th percentile of vehicle speeds, with speed reductions ranging from 10 to 16 km/h (Appleyard, 1981; Ewing, 1999; Sundo and Diaz, 2011; Huang and Cynecki, 2001; Antic et al., 2013). As stated in the methodology, the review is focused on the effects of road hump design and spacing on reducing the vehicle speeds. The general perception of residents on the effect of road humps is also briefly discussed, in order to further gauge the effectiveness of road humps in a residential area.

Related Literature on Effects of Road Hump Design

The importance of the hump design in controlling traffic speed was mentioned by Sundo and Diaz (2011) and Antic et al. (2013), who indicated that with an increase in the hump profile's height or severity, the post-entry speeds and speed in between a series of humps will decrease.

Antic et al. (2013) evaluated the effectiveness of humps 30 mm, 50 mm and 70 mm height in inverse proportion to the traffic volumes along 3 selected roads, and noted that the speeds reduced with an increase in height. Given that this study made use of humps with similar depths, this means that the slope changes with an increase in height and is thus capable of affecting vehicle speeds. Another notable point made was that despite the significant speed reduction for a hump height of 30 mm, the speeds recorded would result in an 80% fatality rate in case of a vehicle-pedestrian collision. Hence this is fairly consistent with general literatures that recommend heights of 50-100 mm (Layfield and Webster, 1998; Bjarnason, 2004; Malaysian Ministry of Road Works, 2012).

In addition, the study by Yaacob and Hamsa (2013) noted that the speed variations were larger in a hump of 60 mm height as compared to another hump of 80 mm height. The gentler slope of the 60 mm hump resulted in more vehicles exceeding the speed limit 30 m before and after the road hump.

Zainuddin et al. (2014) also found that the hump height was positively correlated with the speed reduction between two measured points, and was also a statistically significant predictor in comparison to hump length and width. This study also developed a regression model to calculate the 85th percentile speed reduction between two selected points, in which the hump height and length at each point were used as predictors. The predictors can also be rearranged to identify the suitable hump height and length to use in order to achieve the desired speed reduction.

Conversely, Daniel (2012) found that hump width was a significant factor in affecting device operating speeds at road humps. The model in the study suggested that a lower hump width to road width ratio would result in lower speeds. On a road with 12 m width, a 6 m wide hump was shown to result in a 10 percent reduction in speed as compared to a hump of 11 m width. The relation between ratio and reduction was evidenced further when Daniel (2012) commented that the percentage in speed reduction dropped to 2 percent in the case of a 6 m wide hump constructed over a road with 8 m width, compared to a 7 m wide hump. This means that with a larger ratio between hump width and road width, the speed reductions increase. However, a concern with narrower hump widths is that drivers may drive their vehicles along the edges of the humps in order

to avoid the humps as much as possible. This was one of the negative comments given by respondents in a survey conducted by Cottrell et al. (2006).

On the other hand, the study conducted by Sundo and Diaz (2011) failed to successfully prove the relationship between the hump profile and the driver selection of entry speeds. Thus they stated that the hump height/length ratio was not a good explanatory variable in assessing a driver's speed selection, as there was a wide variation of entry speeds observed. Their conclusion was that driver behaviour is also an important predictor in explaining the speed selection, concurring with Mao and Koorey's (2010) statement that the driving style is a factor to be considered if changes are to be made in the surrounding environment.

Related Literature on Effects of Road Hump Spacing

In addition to road hump design, the spacing in between road humps also plays a factor in influencing vehicle speeds. Hugh Woo et al. (2010) found that tandem speed humps resulted in significant speed reductions of 1.7 – 2.17 km/h as compared to single humps, in a study that compared the effectiveness of single and tandem speed humps in reducing vehicle speeds along a traffic-calmed road. This concurs with Parkhill et al. (2009) stated that a vehicle's operating speed is also influenced by the spacing of road humps in a particular hump scheme.

The study by Sundo and Diaz (2011), which used the direct-timing procedure to measure vehicle speeds in between two selected humps, found that hump spacing was a good predictor in explaining the maximum speed selection. They also explained that if the spacing between 2 humps were divided into four quarters, the middle 2 quarters or midway between the humps would be designated as the 'Danger Zone' with vehicles reaching peak speeds.

In addition, Yaacob and Hamsa's (2013) study in Taman Setapak, Kuala Lumpur found that with a spacing of 70 m, the 85th percentile speeds recorded 30 m before and after the second hump were 31.88 km/h and 33.20 km/h respectively, thus suggesting that shorter hump spacing would be more suitable to maintain the 35 km/h speed limit in a Malaysian residential area. However it should be noted that the study was not actively studying the effect of road hump spacing; instead it focused on the individual effect of each hump.

A study conducted by Mao and Koorey (2010) also found that 2 out of the 7 case studies with vertical measures resulted in higher vehicle speeds after installation. A possible explanation given was that the spacing was too far apart, thus allowing drivers to reach maximum speed in between the devices. However this is not always the case. A Federal Highway Administration (1994) study was conducted on two traffic-calmed sections of roads with similar geometric standards, the difference being the traffic volume and road hump spacing. The reduction in the 85th percentile speeds were 21 km/h for Section 1 with 182 m hump spacing and VPD of 655, and 16 km/h for Section 2 with 176 m hump spacing and VPD of 472. It can be seen that even with a closer distance in humps, Section 2 had a lesser effect on vehicle speeds; therefore it may be concluded that the lower traffic volume had also affected the drivers' choice of speed in navigating through the road section.

Public Perception on Effectiveness of Road Hump

Based on the available literature, the public perception on road humps have generally been positive in regards to speed reductions. A study by Kayode (2015) made use of questionnaires targeting a sample of 150 drivers from commercial, private, company and government sectors. The study focused on the perception regarding road humps; however it found that speed reductions were deemed to be significantly affected by bump type, height, width and spacing. This is concurrent with the literature discussed above on the effects of hump dimension and spacing.

In their study, Cottrell et al. (2006) found that a common positive comment given by the respondents was that the humps reduced traffic speed and volume. This concurred with Du et al. (2001), which studied the perceptions of the residents and travelling public who regularly used the roads and found that both groups agreed on the humps' effectiveness in reducing vehicle speeds. Smith et al. (2002) also reported that after installing temporary road humps, residents agreed that the humps reduced vehicle speeds up to 50 percent. On the other hand, Cottrell et al. (2006) and Du et al. (2001) noted that respondents also complained about drivers speeding aggressively to 'fly' over the humps or driving along the edge of the humps in order to avoid driving over the humps. However this is indicative of variations in driver behavior when navigating over a road hump, and not necessarily an issue regarding the hump design or spacing. Other complaints by the respondents were mostly on the increase in traffic noise levels near the humps (Du et al., 2001; Smith et al., 2002; Cottrell et al., 2006), due to abrupt changes in vehicle speed due to vehicle decelerations and accelerations. Thus it can be generalized that the road hump is effective in addressing the concerns on increased vehicle speeds in residential areas.

Research Gaps from Previous Literature

The previous researches discussed on the effects of road hump profile and spacing was mostly limited to field tests and simulation studies. More studies should discuss field results together with general public understanding and perceptions on traffic calming, particularly in Malaysia. This is important given the inconsistencies in road hump installations throughout Malaysian urban residential areas, which may cause variations in driver behaviour and thus impact their speed selections. Variations in public opinion regarding hump effectiveness may also occur according to the device characteristics.

In addition, the research conducted by Yaacob and Hamsa (2013) and Zainuddin et al. (2014) did not actively take into account the effect of other road humps or traffic calming devices in the same scheme as those studied, while Sundo and Diaz's (2011) study did not take the effects of the road geometry into consideration.

In regards to the public perceptions briefly discussed above, a limitation of Cottrell et al.'s (2006) study was that the origins of all returned questionnaires were not recorded. Thus it was not possible to analyse the responses according to the neighbourhood or hump characteristics.

DISCUSSION

It has been widely proven, both through field data and public perception, that road humps are an effective device in controlling the speed of vehicles and ensuring safety for pedestrians and non-motorized road users. Thus a road hump can be installed as a solution for the deterioration of living conditions caused by increased vehicle speeds by causing a

visual impression that the road was not intended for high-speed or cut-through traffic. Ibrahim et al. (2003) also identified a linear relationship between average vehicle speed and distance from the hump with an R-squared value of 0.91, indicating that a road hump is significant in reducing the speed of vehicles.

The reviewed literatures have sufficiently proven that the road hump profile and spacing are good predictors in determining the effect of a road hump on the reduction of vehicle speeds. As a result, both predictors can be used in further studies in analysing the effectiveness of road humps.

The standard speed limit along a residential road in Malaysia with road hump installation is 35 km/h, which drops to 30 km/h near a school. According to Table 2 below, the reviewed literature recommend hump heights of 50 mm -100 mm and lengths of approximately 3 m - 4 m to achieve vehicle speeds within the 35 km/h speed limit in Malaysian urban residential area.

Table 2: Recommended hump profiles according to previous studies

Author	Hump Height	Hump Length	Achieved Speed/ Reduction
Mao and Koorey, 2010	100 mm	N/A	85 th percentile < 30 km/h.
Zaidel et al., 1992	100 mm -120 mm	3.7 m - 4 m	Travel speed 25-30 km/h.
Bjarnason, 2004-citing Watts, 1973	50 mm -100 mm (R) 100 mm -150 mm (R)	2.44 m (R) 3.66 m (R)	Crossing speed 25 km/h.
Antic et al., 2013	50 mm -70 mm	0.96 m	Reduced 85 th percentile speeds ranging from 10 km/h to 22 km/h, significant in reducing risk of collision injuries for pedestrians.
Layfield and Webster, 1998	75 mm (R)	N/A	Reduced 85 th percentile speeds between humps by an average of 16 km/h. Compromise to ease movement of buses and emergency vehicles.
Berthod, 2011	80 mm	4 m	85 th percentile speed ranging between 30 km/h - 35 km/h
Malaysian Ministry of Road Works, 2012	50 mm -100 mm (R) 75 mm -100 mm (S)	3.7 m - 4 m (R) 3.8 m - 4 m (S)	In areas with 85 th percentile speed between 25 km/h - 45 km/h, can result in reduction of speed ranging from 15 km/h - 30 km/h.

Note: R = Round-Top
S = Sinusoidal

In accordance with Table 3, the literature reviewed recommended a hump spacing of not more than 80 m to maintain travel speeds within the 35 km/h speed limit. However this differs from the Malaysian standard as stated by the Malaysian Ministry of Road Works (2012), which identified 100 m as the recommended spacing between humps. Nevertheless the Malaysian standard acknowledges that a set of properly spaced humps can significantly reduce travel speeds. The Malaysian Ministry of Road Works (2012) also added that transverse bars can be installed together with humps if greater speed reductions are required, which concurs with Martens et al.'s (1997) statement that

transverse road markings or transverse rumble strips can be used to warn drivers of an upcoming hazard and help to reduce speed of the vehicles.

Table 3: Recommended hump spacing according to previous studies

Author	Hump Spacing	Achieved Speed/ Reduction
Zaidel et al., 1992	40 m - 60 m apart or away from an intersection	Travel speed 25 - 30 km/h, Hump speed 15 -25 km/h.
Mao and Koorey, 2010	<60 m	85 th percentile speeds <30 km/h
Sundo and Diaz, 2001	48 m - 54 m (<60 m)	Travel speed <40 km/h.
Layfield and Webster, 1998	<80 m	Mean speeds midway between humps <32 km/h, provided humps are of 75 mm height

It is also interesting that as explained by Lee et al. (2013), the effectiveness of an existing device installation can also be assessed by using Roess et al.'s (2004) equation. The equation compares the existing spacing with the value derived for S . In the case that the existing spacing is less than S , it could be assumed that the performance of a road hump would be affected to an extent by any subsequent devices in the traffic calming scheme. Roess et al. (2004) also stated that the equation can be used to determine the minimum distance after passing a traffic calming device. This equation is based on the road's speed limit and minimum driving speed, as below (equation 1).

$$\frac{v^2 - v_0^2}{2a} = S \quad (1)$$

where,

- V : speed limits,
- V_0 : minimum driving speed,
- a : acceleration rate (passenger car acceleration rate is 2.286 m/s²), and
- S : the resulting minimum spacing between the devices.

However, there is a lack of standardization in the construction of road humps throughout Malaysian urban residential areas (Abdul Manan and Hoong, 2009). Given the importance of the hump profile and spacing in reducing vehicle speeds, the lack of standardization may reduce the effectiveness of road humps as a traffic calming device and cause discomfort to passengers. Thus further studies should be conducted on the effects of existing road hump profiles and spacing to determine their effectiveness in reducing vehicle speeds and improving the liveability of residential areas.

It should also be noted that in addition to the profile and spacing of road humps, some literatures have stated that there are also other factors that need to be considered in analysing the effectiveness of a road hump scheme on vehicle speeds. These factors are namely driver behaviour and the traffic volume along the selected road. The variations observed in driver behaviour upon approaching and accelerating away from the humps have led to inconsistencies in the speeds recorded, and higher traffic volumes will impede drivers from driving at free-flow speeds. The focus on driver behaviour necessitates that the results of a field study be corroborated with the perceptions of residents in the studied

residential area, in order to further understand the driver behaviour in their speed selections.

CONCLUSION

The literature review presented in this paper discussed the effectiveness of road humps in reducing the speeds of vehicles along selected roads, particularly in terms of road hump profiles, hump spacing and public perceptions. From the review, it is indisputable that road hump profiles and spacing are important factors to assess road humps along a residential road. However, there are also different factors that may affect the effectiveness of the road hump schemes, such as the daily traffic volume and driver behaviour. The gaps identified from the previous studies are the considerations of road geometry and the effect of other road humps along the selected roads, as well as the analysis of questionnaires according to the neighbourhood and hump characteristics. As the road hump installations in Malaysia have been largely on an ad-hoc basis with no reference to the official guidelines, the analysis of public perceptions according to existing characteristics would be important in Malaysia. Given that the residential living environment is of importance, it would be very significant to understand the residents' perceptions on how the road hump has impacted their environment. Thus any further research conducted in Malaysia should consider public perceptions as an important parameter in determining the effectiveness of road humps, and discuss the perceptions together with the obtained field results based on the existing hump profiles and spacing.

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IMPLICATIONS OF SPRAWLED AND COMPACT DEVELOPMENT ON MOBILITY PATTERNS: A CASE-STUDY OF BHOPAL, INDIA

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Abstract

Cities across the world are witness to increasing phenomenon of urban sprawl. The paper contends that sprawl affects mobility in terms of increased dependence on private motor vehicle which is high in energy use and carbon emissions. The study is based on primary investigation of three neighbourhoods in Bhopal city (India), the first two lying within the city in varying contexts and the third outside the present city limits which can be classified as a sprawl. The analysis throws significant light on the changes in mobility pattern in areas with more compact development vis-à-vis those that have sprawled with relatively lower densities. It shows that densely populated areas having mixed use has higher share of walk trips and that the average trip length is higher in lower density areas in sprawls. The study further examines the role of land use planning, zoning regulations and urban form in encouraging sustainable mobility.

Keyword: Urban sprawl, Sustainable mobility, Land Use planning, Zoning regulation, Travel behaviour

INTRODUCTION

The world is experiencing tremendous urbanization, especially in the developing world. In the global context, India's urbanization is expected to take place at a massive scale with about 590 million people living in cities by 2030. Further, it is predicted that the number of cities with a million plus population will increase from the current 42 to 68 by 2030 (McKinsey, 2010). Existing and new cities need to add additional spaces to accommodate this growing urban population. This phenomenon of urbanization often leads to sporadic development in the outer peripheries and beyond the city boundaries in peri-urban areas or fringes of agglomerations, thereby creating pressure on natural resources and environment. A lot of agriculturally and ecologically productive land is thus making way for unmindful urban expansion. Already, large cities are witnessing the fallouts of rapid urbanization, in terms of haphazard and sporadic development, resource depletion, unsustainable mobility patterns and increasing levels of pollution. Tremendously growing urban population and urban areas reflects reduction in per capita amount of land which has come down to 67% from 1951(0.48Ha) to 2008(0.16 Ha) in India. Thus, the way these cities grow in the coming decade are bound to have profound implications on the natural resources, ecologically fragile and agriculturally productive areas, environment and social sustainability and also long-term economic prosperity of

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these cities. In this era of resource scarcity, where food security and depletion of resources is an area of concern, and the world needs to produce more food to feed 9 billion people by 2050, it is imperative to address and control sprawls.

ZONING REGULATIONS AS A CAUSE OF SPRAWLED DEVELOPMENT

It is important to understand the causes of sprawl development if we need to address the solutions effectively. Studies list a multitude of causes out of which planning and zoning regulations is cited as an important one. Siedentop (2005) identifies two major causes of urban sprawl, one of which is regulation controls. A study for measuring compactness through various parameters and dimensions of measurement of compactness by Kotharkar (2014) found density and FAR plays important role in spatial expansion of city. These studies indicate that sprawls in city takes place due to proposing regulation not specific to city structure and to the direction of development like density variation based on potential of the area, FAR, and skewed landuse distribution. Factors such as low density leading to more consumption of land by households, single use zoning or spatial segregation of different type of landuse, leapfrog development and no centralised ownership of land or planning of development abet formation of sprawls. A Habitat (2013) report claims that the pace of sprawl and mobility impact is major function of zoning regulation i.e. urban form – emerging either from a haphazard process of locating settlements and activities, or from strategically planned intervention it makes a big difference in mobility systems.

One of the reasons that cause Indian cities to expand outwards spatially is low permissible FAR in central locations. Bertaud (2002) found that Indian cities have lower densities and floor area ratio (FAR) of approximately 1.6 as compared to other cities of Asia which have values ranging from 5 to 15 in centrally located areas.

Crane and Chatman's (2003) suggest for zoning regulation such as proposed landuse, density and FAR to be designed in such a way so as to reduce distance and transportation needs and focus on bringing people and places together. Similarly other scholars emphasise on intensity of mixed landuse as it increases opportunity for walkable destinations (Chapman and Frank, 2004, Kuzmyak, 2009; Pushkar et al., 2000).

EFFECTS OF SPRAWLED DEVELOPMENT ON MOBILITY

Sprawls are characterized by structure and form attributes of a settlement system. Literature on sprawl typifies them as essentially low density, single use, and fragmented development. It is understood as an urban form building process that transforms a former monocentric compact structure into a discontinuous, polycentric and disperse settlement structure (Galster et al. 2000, Torrens, Alberti 2000, et al.). There exists a plethora of research indicating that due to their very nature of development, sprawls tend to disperse activities and subsequently increase vehicle travel (Litman, 2015). These in turn impose various economic costs in terms of increase in motorized trips ultimately contributing to increased energy consumption and pollution levels, less walk and cycle trips, loss of agricultural land and productivity, lack of employment accessibility, increased cost on infrastructure and increased cost on travel. This is further corroborated by Ewing et al. (2002), who observed that metropolitan sprawl bore correlation with higher rates of driving and vehicle ownership, increased levels of ozone depletion, greater risks of fatal

accidents, declined rates of walking and transit ridership, and higher rates of obesity. These contribute towards negative impacts of sprawled development. At the same time, there also are evidences supporting the positive impacts of sprawls, and these are experienced by sprawl residents, in terms of increased satisfaction of housing preferences, better environment compared to dense city areas and increased convenience to travel by car. Nonetheless, they impose external costs to the city on the whole. A 2002 study in Chicago, Los Angeles and San Francisco demonstrated that families living in sprawl own three times as many cars and drive four times as much as families of same size and income living in location efficient neighborhoods. Similar research found that in case of a compact development in a city, every additional passenger-kilometers travelled on public transit translate into 8-10 kilometer reduction in citywide driving (Holtzclaw, 1994). The same study also concluded that the difference between 20 dwellings/acre (urban densities) and 5 dwellings/acre (suburban densities) was a 40% increase in travel. Another study by Wang (2013) concluded that vehicle travel is 9% lower for households that reside in mixed land use neighborhoods with good network connections.

It is quite evident that sprawled development has considerable amount of impact on mobility and environment, since the spread out pattern of development tends to increase the dependence on private automobile leading to increased carbon emissions. There is increasing recognition that density and design both play an important role in shaping city structure and growth pattern and landuse planning tool creates built environment along five core dimensions or the '5 Ds': density, diversity, design, destination accessibility and distance to transit entails paying attention to multiple scales of urban mobility. A number of studies have shown that design intervention through planning leads to an enhancement of economic and social value of a city. As a planner one thus needs to understand the urgent requirement of integrating landuse zoning regulation and mobility for sustainable growth of cities

Taking example of an Indian city Bhopal, this paper attempts to find out how zoning regulation in the city have impacted the mobility patterns. It also builds a relationship between the indicators of urban form and mobility so as to make clear the causes and consequences. The analysis throws significant light on how the mobility pattern changes with areas having more compact development vis-à-vis those which have developed as sprawls and with lower densities. One of the consequences of sprawled development is implication of zoning regulation on carbon emissions, and the paper tries to compare both areas close to city center and sprawls. The study has also critically analyzed the Masterplan of Bhopal which has earmarked extensive parcels of land in the peripheries with almost uniform density and FAR without considering potentials of certain areas to have higher densities and FAR.

BHOPAL URBAN SCENARIO

Bhopal is the capital of one of the states, Madhya Pradesh in India, thereby making it an administrative hub. According to the 2011 Census of India the population of the city is 17, 95,648 with a declining growth rate (25.33% in 2001-11). Figure 1 indicates that the population growth rate of the city increased tremendously in the earlier decades and then showed a sudden decline due to Bhopal gas tragedy in 1984 and further due to the state of Chhatisgarh being carved out and separated from Madhya Pradesh, prompting migration of many government employees to the newly formed state. Having 70 wards,

covering a gross area of 285 km² (Bhopal municipal limit) including the lakes and hills, the city is a low-density city of 50 persons per hectare (PPH). Even if the areas of steep hills and the lake area of 38 km² are discounted, the density on habitable land remains low at 80 PPH.

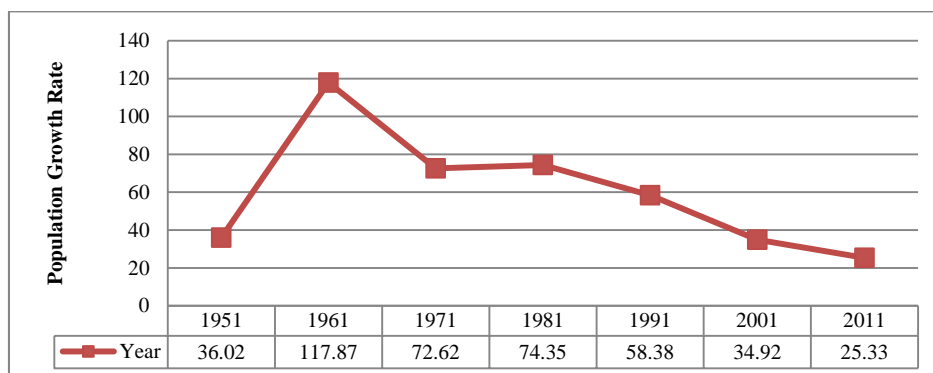


Figure 1: Decadal Growth Rate of Bhopal
 Source: Census 2001, 2011, Bhopal Masterplan, 2005

SPATIAL GROWTH AND SPRAWL

Despite a declining population growth rate, the spatial expansion of Bhopal is high, which is an area of concern. The city has expanded almost three-folds from 1989 to 2012, as can be seen from Table 1, which is tremendous given the fact that this was the phase during which the population growth rate started declining.

Year	Area (in Km ²)
1989	53.30
1994	63.9
1999	95.1
2005	125.70
2012	140

Source: Calculated and compiled by author through various sources Draft Bhopal Masterplan 2021, Bhopal

Table 2 also indicates that although the rate of spatial expansion in the last decade has shown decline from 89.09% to 34.04 %, it is still high when compared to other cities in the country which are similar to Bhopal in terms of either population or spatial structure, such as Lucknow (23.58%) and Nagpur (23.8%).

Year	Bhopal	Lucknow	Nagpur
1991	-	57.7	-
2001	89.09	23.2	20.47
2011	34.04	23.58	23.8

Source: Draft Master Plan of Bhopal 2021; Regional Remote sensing service centre, Nagpur; Siddiqui, 2012

Figure 2 shows the spatial growth of the city over the last two and a half decades. It can be seen that most of the new residential areas are sprawling towards south-east and south west directions i.e. Kolar and Hoshangabad areas unlike the proposed Master plan (as indicated in Figure 3) which has proposals of residential pockets in each of the direction.

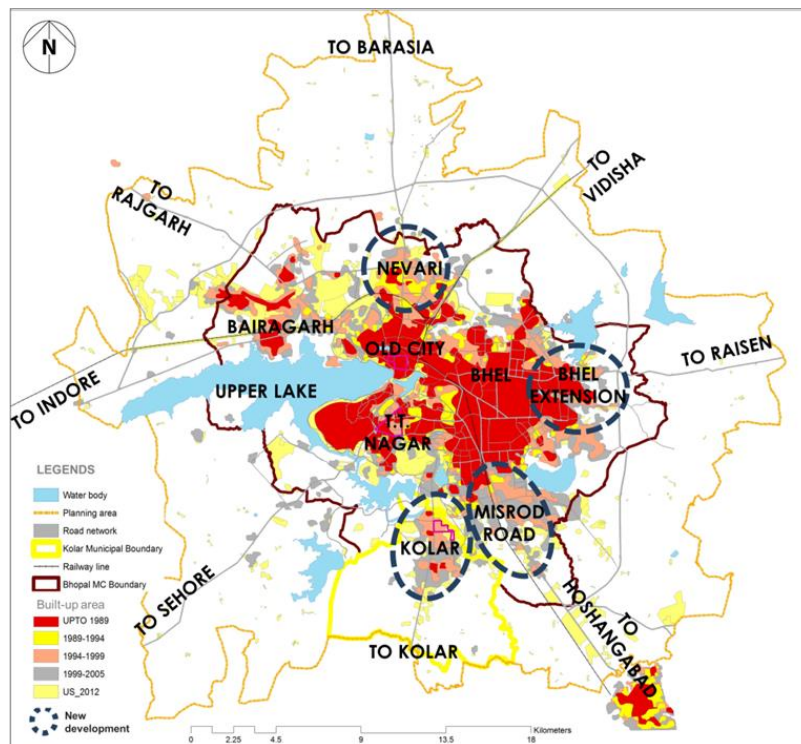


Figure 2: Spatial growth of Bhopal from 1989 to 2012

Till date, three development plans for Bhopal have been prepared out of which the Bhopal Development Plan (BDP) 2021 was rejected and at present a new draft is under process for the horizon year 2031. The first Development Plan for Bhopal i.e. BDP 1991 was prepared in 1973-75. It focused on the efficient and judicious utilization of land, compact city development, hierarchical city structure in terms of self contained units and

effective and direct linkages between the work centers and living areas, minimizing travel distances. In 1994, the second Development Plan for Bhopal (which is followed till date) was prepared in accordance to the implementation of the previous plan. At this time the city had started to grow as a multi nuclei city. So the objectives for the plan were undertaken as ‘Multi Nuclei Compact City development’, environmental conservation, conservation of cultural assets, efficient utilization of land, providing infrastructure and facilities and proposal for participation in land allotment and infrastructure development. Although the Bhopal Master Plan 2005 envisaged a ‘Multi- Nuclei Compact City Development’, its vision appears farfetched given the current way the city has expanded. There are efforts to redensify certain parts of the city, but it is quite insignificant as the proposed area for redensification comprises of only 1.74% of the total proposed residential use. The proposed residential area as per the Master Plan itself is more than double the existing residential area i.e. 36.6 Km² to 81.9 Km². Further, the master plan proposes a uniform residential density of 250 PPH (with 25 PPH in areas having physical constraints) in all directions, as can be seen in Figure 3, without considering transit corridors and activity hubs which could have been addressed through TOD concept so as to have varied density and more efficient utilization of land resources.

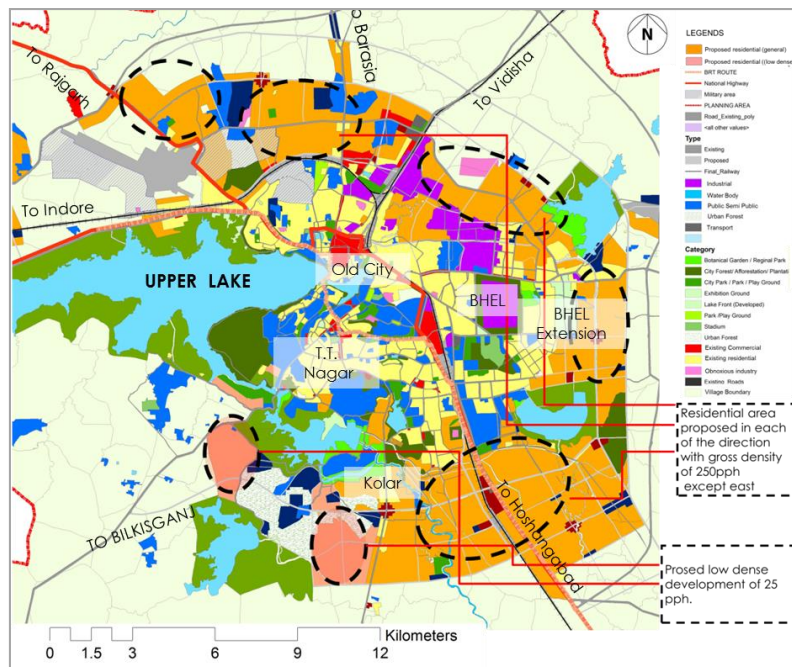


Figure 3: Proposed Landuse 2005
 Source: Bhopal Masterplan 2005

ZONING REGULATION

Proposed housing density and FAR have been prescribed in Bhopal Master plan 2005 which are being followed till date. The proposed densities (gross residential density) vary

from 50 PPH to 250 PPH. Only one small area in the city (T.T. Nagar area) proposed for redensification has a proposed density of 675 PPH. The FAR vary from 0.15 (mainly west of Kolar due to topographical constraints) to 1.25, in all the new development. The proposed redensification area is permitted to have a higher FAR of 2.5 as per group housing development control regulation.

MOBILITY

The mobility pattern of Bhopal city overall shows that average trip length (ATL) has increased over the years i.e. from 3.1 km to 5.4 km which indicates that the average distance from home to other activities have increased; indicative of low density and sprawled development. The draft City Mobility Plan of Bhopal estimated ATL of commuters on buses and intermediate public transport (IPT) as 7.4 km. Majority of trips are within the range of 2-5 km and 7-10 km; this also indicates that there is requirement to address the need of sustainable mobility as the trips are becoming gradually longer. The modal share in the city on an average shows that maximum trips by commuters are taken up by walk, two wheeler and public transport (Refer Table 3), indicating that the mobility issues are not that critical and with apposite interventions, the trend of increasing trip lengths and changing modal split can be reversed towards a more sustainable direction. Because of the constant rise in the number of motorized vehicles the city felt the need to wean people away from private vehicles and persuade them to use public transport and consequently introduced a bus rapid transit system (BRTS). A Metro rail is also proposed having 6 routes.

Table 3: Modal Share, Bhopal

Mode	Percentage
Walk	43
Cycle	3
Two wheeler	25
Public Transport	20
Car	6
IPT	1

Source: Draft Report on Comprehensive Mobility Plan for Bhopal, 2012

DATA AND RESEARCH DESIGN

In order to understand and develop relationship between zoning regulation and its implications on mobility pattern, the study is based on primary investigation of three case areas (neighborhoods) in Bhopal city in varying contexts. The areas have been identified based on parameters such as proposed density, applicable floor area ratio (FAR), period of development, distance from city center and availability of public transport.

The first area is located in the Old city (in the core area of the city) having a density of 518 PPH (high density) and is an organic development having mixed use; the second area is South T.T. Nagar having a density of 255 PPH (medium density) and located near major activity centres; and the third area is East of Kolar having density of 136 PPH located outside municipal limits and can be classified as sprawl. The total areas of the 3 case study areas are 53 Ha, 90 Ha, and 83 Ha respectively. Master plan 2005 proposes, for old city to retain the existing density as it is highly dense with very narrow streets.

South T.T. Nagar area is proposed for redensification with a new proposed density of 675 PPH and permissible FAR of 2.5. The density for Kolar is proposed to be increased upto 255 PPH with 1.25 FAR.

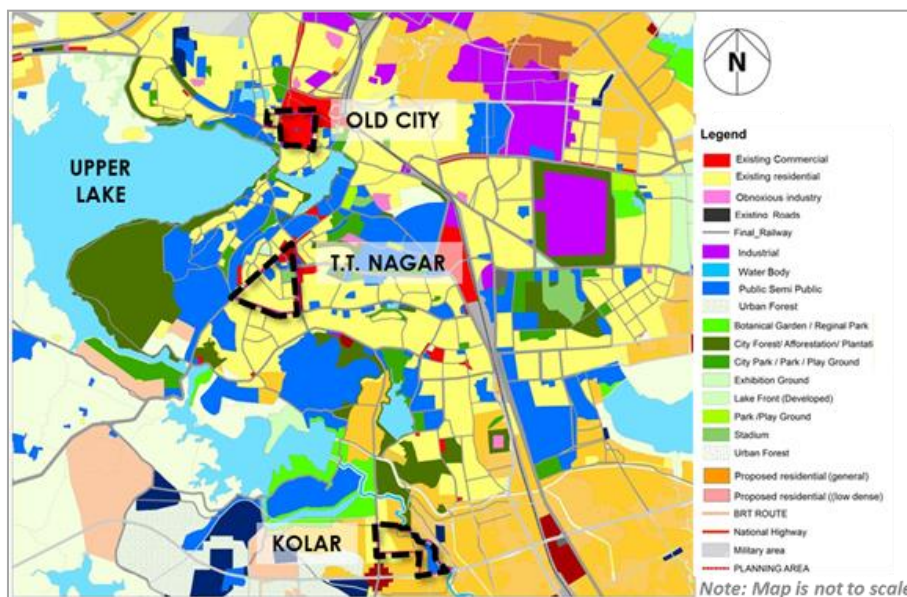


Figure 4: Map showing three case study areas in Bhopal City

The indicators identified for analyzing the case areas included broadly two aspects, one of them is urban form and the other one is mobility. Household survey was conducted in the three selected case areas to capture the trip characteristics of residents. A total of 150 households (50 households from each case study area) were surveyed. The population frame consisted of approximately 11,100 households.

Based on different researches carried out in the field, the indicators of urban form considered for this study are taken as density, FAR and landuse; and mobility indicators to assess the impact of urban form are modal share, average trip length (ATL) by mode, average trip length (ATL) by purpose, modal share by trip purpose, per capita trip rate (PCTR), vehicle ownership pattern and access to public transport.

SPATIAL AND MOBILITY CHARACTERISTICS IN THE THREE CASE STUDY AREAS

Spatial Characteristics of Case Study Areas

The three case study areas that are Old city, South T.T. Nagar, East of Kolar. Old city is the walled city of Bhopal with Jama Masjid as its centre and two perpendicular lines dividing it in four grids. Existing density of more than 500 PPH, predominant mixed landuse (having residential, commercial, retail and public/semi public landuses) characterize this area. The mixed use is about 39% and uniformly distributed in all of the

area, followed by residential use (34%), commercial area (10%) and PSP (5%) which includes heritage building, religious building and educational centers. The area lacks in neighborhood recreational spaces, but is close to Upper Lake recreational area (city level).

The second case area South T.T. Nagar with a density of 255 PPH is a planned development and is close to the important work centres in the city. It has a mix of government and private housing (54%), an important city-level commercial facility (New Market) (11%), city-level recreational area (T.T. Nagar stadium) (8%) and public semi public area (10%).

The third case area, East of Kolar (13kms from the city centre) characterized as sprawl with a density of about 136 PPH is of predominantly residential use. Commercial areas can be observed along the main access road which is not conforming to the proposed master plan. This area is now a part of Bhopal urban agglomeration. Major transformation visible in this area is commercial development along the main road. The work centres are located far from this area because of which it lacks job-housing balance. Further, the area has no mixed landuse and recreational spaces.

Zoning regulation and mobility

The following section discusses the parameters of urban form and mobility and their correlation. The applicable regulation in the three study areas are indicated in Table 4.

Table 4: Spatial characteristics and zoning regulation of case study areas

Study area	Old city	South T.T. Nagar	East of Kolar
Area	53 Ha	90 Ha	83 Ha
Population	30,104	23,000	9,399
Existing Density	518PPH	255PPH	136PPH
Proposed Density	To retain existing density	675 PPH (as per redensification scheme)	Upto 250 PPH
FAR Permissible and ground coverage	Residential- 1.25 to 1.75	Residential - 2.5	Residential - 1.25
	Commercial- 2.5	Commercial- 2.5	Commercial - 2
	Ground coverage- 80 %	Ground coverage - 30 %	Plotted development ground coverage ranges from 30% to 60%
		Existing residential FAR - 1.25	Existing FAR - less than 1.25
Housing Typology- Plotted development	Central core area have Unplanned old built up, plotted development	Government Housing - mainly plotted development for F, G, H and I type , on the southern most part - Private housing plotted development	Private housing and townships, Plotted development as well as group housing, maximum area have plotted development
		Plot size range- 50 m ² to 2000 m ²	Plot ranges from 50 m ² to 1500 m ²
	Exceeds Ground coverage with almost 80-90 %		Ground coverage is as per the range of DCR

Housing Typology- Group Housing	Group housing includes commercial shops in ground floor and residential use in above floors	Apartments by housing board one such project - Platinum Plaza providing housing for MIG and HIG, FAR achieved in that project 2.5, G+9 storied building; private housing for MIG as well as LIG on western part of south T.T.Nagar	No of floors in apartment ranges from G+4 to G+5, Along the road G+3 commercial complex, Majorly plotted development single family housing. While moving away from road, near to drain, newly developed apartments.
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The study reveals that these three areas having different zoning regulation and type of development show different mobility patterns. Figure 5 indicates the ATL with respect to the purpose of trips, in the case study areas. Through close examination of the collected sample, it is clear that the ATL has a direct correlation with the density of the areas: 3.1 km in high density area, 4.1 km in medium density area and 7.7 km in low density sprawls.

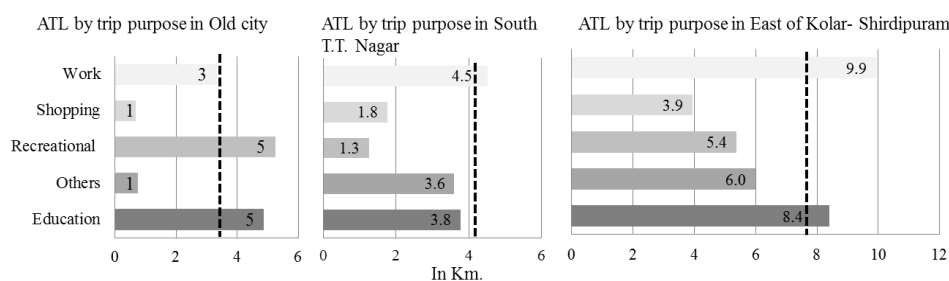


Figure 5: Average Trip Lengths (in Kms) by Purpose of Trips
 Source: Primary Survey, 2015

It is further interesting to note that in old city area where workplaces are close to residences, ATL for work trips (which is a more regular trip) is the lowest (3 km); the ATL for work trips is exceedingly high in sprawl area (9.9 km). ATL for educational purposes also increases from 5 km to 8.4 km from dense compact areas to sprawled areas. Increased intensity of landuse mix and proportional distribution has positive impact on mobility, as it is inversely related to ATL. ATL for shopping purpose also increase significantly as we move from compact development to sprawls.

The study also reveals that walk trips are not only maximum in high density area with mixed landuse (39% in Old city area) they are also longer in these areas, i.e. 0.8 km in Old city and 1.2 km in South T.T. Nagar area in comparison to sprawled area where commuters tend to make shorter walk trips (0.6 km).

The modal share (as illustrated in Figure 6) in high density mixed use area (Old city) is indicative of a more sustainable mobility pattern, where walk trips are as high as 52 %. Thus density and mixed landuse have positive relation with walk trips, whereas this is just the reverse in low dense area (Kolar) where 51% trips are undertaken by private motorized modes (car and two wheeler). This is reflective of the fact that households prefer to walk when facilities and work places are nearer to their residence which is supported by high density and mixed landuse. Even medium density area having

proportional distribution of landuse and better availability of public transport increases trips by public transport (32% in South T.T. Nagar).

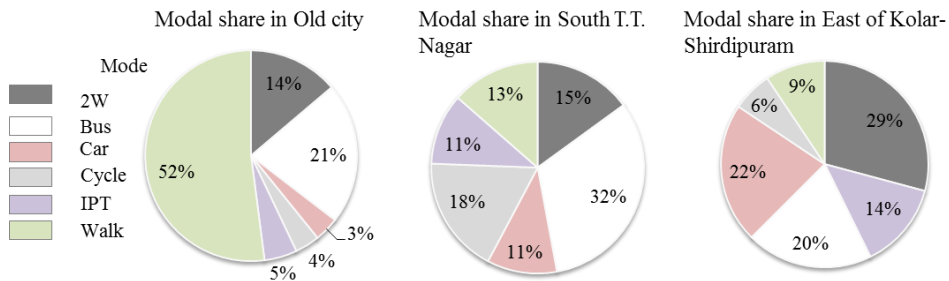


Figure 6: Modal Share (in Percentage)
Source: Primary Survey, 2015

For daily trips, such as work and education higher percentage is covered by walking in Old City (14% and 21% respectively); less than 5% of these trips are made by car. In contrast in the sprawled area a higher percentage of the corresponding trips are covered by private mode (13% and 14% respectively). The areas close to city centre have higher accessibility to public transport: Old city is served by both BRTS and IPT (Tata Magic) unlike sprawled areas where there is limited accessibility to public transport.

The investigation also throws light on vehicle ownership in case study areas: it shows some amount of relation on location (proximity to CBD) and type of development (compact or sprawl), although this cannot be taken as conclusive since the socio-economic characteristics of the three areas are not similar. It was evident that in sprawled areas households dependence on private mode increases and as subsequently the ownership also increases (81 % of households own private vehicle; 47% owns car and 34 % owns two wheeler) as they find walking, cycling or using public transport difficult and prefer private mode for better convenience. Thus, absence of policies like smart growth, transit oriented development (TOD), new urbanism at zonal or area level through zoning regulation tends to create unsustainable mobility.

IMPLICATION OF ZONING REGULATION ON MOBILITY, CARBON EMISSIONS AND SUSTAINABLE DEVELOPMENT

The study develops two alternative scenarios to understand the implications of different zoning regulations on sustainable mobility for the city. Scenario one is implications with revised zoning regulation and scenario two is observing status quo (that is, if redensification of T.T nagar does not happen). The revised zoning regulation (proposed as per zonal plan within the framework of Bhopal master plan 2005) in South T.T. Nagar area, stipulates the density to be 675 PPH (from the present 255) and FAR as 2.5 (from the present 1.5). In scenario one, the assumption are that modal share, average trip length(ATL), per capita trip rate are assumed to be same as that observed in the existing analysis of T.T.Nagar area for calculating vehicular km travel (VKT), consumption of fuel and carbon emissions. In scenario two which is status-quo it is assumed that when redensification doesn't take place, extra population which could have been accommodated within T.T. Nagar area will reside in any sprawl area in absence of

housing options close to city, and as such the trip characteristics are assumed to be similar to Kolar area (sprawled area). The emission standards per vehicle km are taken as 173 gm per vehicle km (Automotive Research Association of India, 2008). for car and 44 gm per vehicle km for two-wheeler (Michael Foley, 2013).

The analysis of both the scenario as shown in Figure 7 indicates that there can be reduction in total vehicle km travel by 46.5% if redensification takes place and people get opportunity to reside near city center unlike in Scenario 2 where vehicle km travel will get doubled as facilities and job opportunities will be far away from residence. This finding corroborates with Litman’s (2015) study which identifies increase in per capita land development as sprawl’s major resource impact, and by dispersing destinations, it increases total vehicle travel, which in turn have various economic costs. The cost of sprawl not only affects total travel but also cost on travel expenditure and fuel consumption which gets double in case of Bhopal if phenomenon of sprawl is left to continue at this pace. If redensification takes place, then both fuel consumption and expenditure on fuel will reduce by 58.3 %, which is quite high for households. Studies indicate that more compact development can provide substantial energy savings (Ewing, et al., 2009; UNEP 2011).

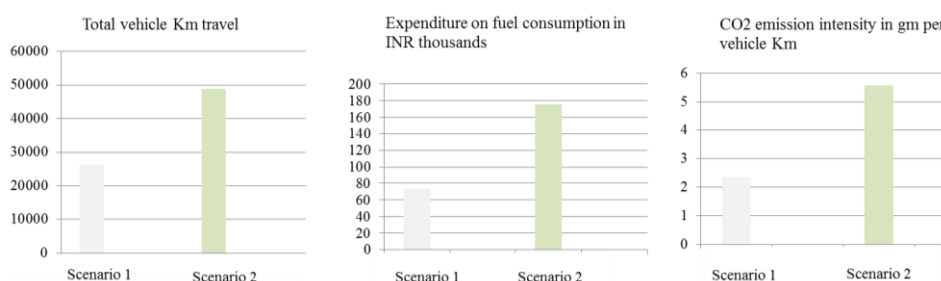


Figure 7: Reduction in vehicle Km travel, expenditure on fuel consumption (In INR thousands) and CO₂ emission intensity

A recent report (Environmental Defence, 2013) identified various external costs of sprawl including higher infrastructure costs, loss of open space and farmland, increased driving and related health problems, increased air pollution emissions, and reduced community cohesion (positive interactions among neighbors). For example, various studies at international level concluded that sprawling Atlanta produced six times more transport-related carbon emissions than relatively compact Barcelona. In case of Bhopal CO₂ emissions in Scenario 1 is 57 % lower than that of Scenario two where there is higher dependence on private low occupancy motorized trips with higher trip length. Implying improved zoning regulation at faster pace so that the mobility improves in terms of less travel, lesser consumption of fuel and lesser carbon emissions is question in today’s context of planning where policies and plan should try to achieve sustainable mobility not only by providing facility but also framing regulation to achieve the vision.

PROPOSED STRATEGIES AND CONCLUSIONS

A revision in zoning regulation and relook towards the approach in proposing landuse zoning regulation is required so as to reduce sprawl and optimize expansion of the city.

Increase in city area and decline in average density eventually squeeze out public transport and non-motorized transport usage. These issues of sustainable mobility should be addressed at local level through revising zoning regulation. In order to reduce travel demand and negative externalities of transport, density of built-up area needs to be optimised and mixed land use promoted, to enhance proximity of people's home to activities. It is also found that these conditions encourage walking habits and people are willing to walk longer distances. The study tried to establish the relationship between the components of urban form and mobility, and their importance in tackling the accrual problems caused due to unrestrained and sparse expansion of urban landscape. To attain sustainable mobility proactive approach towards integration of land use and transport planning is required. The vision of compact development can be achieved only when New Master Plan of Bhopal for horizon of 2031 (in process) is prepared keeping in mind the need and essentials of multi nuclei compact development and environmental issues. Future development should not only focus on fulfilling infrastructure and housing requirements but also on ways and means through which the needs are met through reduced per capita consumption of land and other resources, even if it requires restriction on development of inexpensive urban-fringe land. This would also be in tune with the report of steering committee on Urbanization (12th Five Year Plan, 2012-2017), which recommends under planning strategies: *“Incentivise strategic densification: Strategic densification with mixed land use as a planning strategy needs to be pursued to accommodate future urbanization needs. In addition to this, mandating inclusionary zoning and providing higher Floor Space Index (FSI) with provision for amalgamation of plots to make the economics of affordable housing viable should be considered.”*

For a sustainable and compact development, various policies and strategies like smart growth, new urbanism and transit oriented development have been adopted in developed countries to overcome the issues of mobility. Higher densities and better public transport access are traded off against the greater flexibility of the car. In some situations TODs can reduce car use per capita among their residents by half and save households around 20 percent of their income, as they have lower levels of car ownership which is concluded by Cervero (2008 cited Banister 2012, p.5). These strategies can also work in case of Bhopal. The recommendations for increasing sustainable mobility and reducing sprawls in Bhopal are discussed below.

- a. Land use and density proposed as per Masterplan 2005 should be revised in New Master Plan 2031, as demarcation for residential area is contradicting its “compact city development” vision. The vision cannot be achieved from top level; it is only possible when lower level planning is also aimed through compact neighborhood. For sustainable mobility, neighborhoods /zones can be developed within the scope of zonal plans as walkable units and as it is evident from the study- intensity of land use mix decreases car ownership, the proposal should avoid single use zoning.
- b. Redensification of other areas for reducing city expansion and increasing gross density of 60pph (As per Urban and Regional Development Plan Formulation and Implementation guidelines, the ideal density for metropolitan city is 125pph-175pph). Instead of drastically increasing land under residential use, density needs to be increased.
- c. Revise zoning regulation to have high density and form based development (vertical) Height restriction and FAR should be relaxed to have efficient usage of

- scarce land.
- d. High density and mixed landuse zone should be provided along BRTS and Metro corridor after assessment of infrastructure. Masterplan should have a landuse category of mixed landuse. Considering potential of old city area for developing into walkable neighbourhood, more pedestrian friendly environment should be encouraged, so that people continue to make more walk trips. No vehicle zones should be identified so as to restrict vehicular movements in old city area. The area should not go beyond the existing density 518 PPH, as it would not be sustainable, given the high ground coverage and narrow street widths
 - e. South T.T. Nagar has also tremendous potential for walkable neighbourhood and its redensification provides scope for compact development sensitive to walking and cycling, to cut down the burden on increased parking requirements and other facilities. South T.T. Nagar area should be developed as a high density development with adequate social infrastructure and access to public transport with feeder service to enhance last mile connectivity.
 - f. Areas which are low dense should be developed as contiguous development through infilling; TOD along transit corridors should be explored. TOD can be developed along Hoshangabad road and infilling of the vacant areas between Hoshangabad road and Kolar road, and east of Hoshangabad road is required.
 - g. Development of work centers and social infrastructure within the city limits to cut down increased dependence on other areas and decrease trip length.

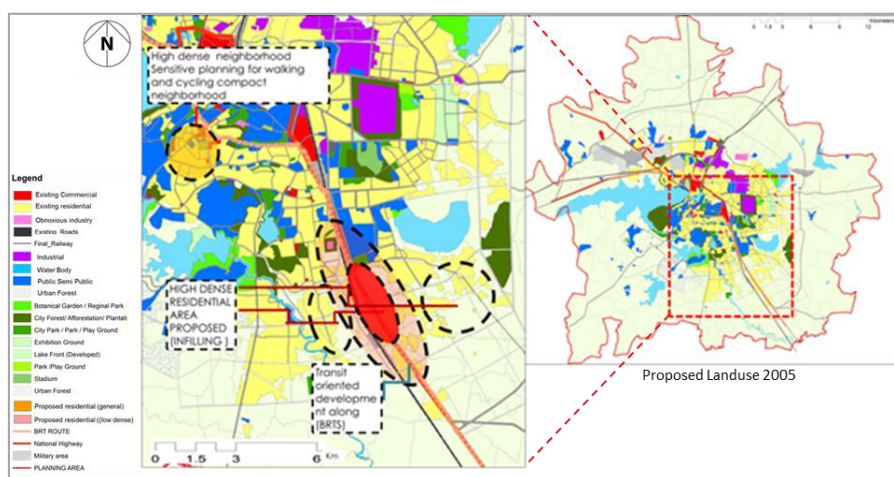


Figure 8: Proposed Strategies

Sprawl considerably suppresses sustainable mobility via affordable and environmentally friendly modes like walking, cycling and public transport. They not only shift the fulcrum towards ubiquitous private mode usage but also result in increased emissions. Policies and Master Plan should be made in such a way that it directs sustainable use of resources, thereby reducing the economic cost imposed by sprawls on the city and its residents. Sustainable densities at strategic locations with a combination of mixed uses are the likely panacea for cities so as to minimise transport sector footprint.

Reform in zoning regulations is thus the need of the hour and cannot be overlooked if cities have to grow sustainably.

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**RESEARCH FOR A COMPREHENSIVE AND ACTIVE PLANNING
METHOD IN AN INDUSTRIAL-RESIDENTIAL MIXED AREA-
FOCUSED ON OTA CREATIVE TOWN VISION IN OTA WARD,
TOKYO**

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Abstract

Recently in Japan, the urban environment in industrial cities has been changing due to changes in the industrial, economical, and social structure. Ota Ward in Tokyo has small industrial districts, some of which are mixed-use areas. In the 1980's there were 9,000 factories, but currently that number has been decreasing and although the factories still possess sophisticated skill-sets, their working environment is inadequate as it is surrounded by too many residential dwellings. In addition, it is too difficult to pass technical knowledge onto succeeding generations. In this research, we focus on a comprehensive and active planning method, specifically, on how to integrate manufacturing, community development, and city promotion so as to solve this kind of problem in mixed residential-industrial cities. Firstly, we investigated the local resources, which consisted of a small industrial network of a "mixed-used" status in Ota Ward that had access to an international airport. Secondly, we created a vision encompassing these three points: (1) Stock (property) management, (2) Supporting Creative Industry, and (3) City Promotion via Industrial Tourism. Currently two projects are in progress: One is the industrial tourism event, "Ota Open Factory", which is a one day program where many restricted access small factories are opened to the public in the mixed-used industrial area; and the other is "Creative Town Lab. Tamagawa", which is an active community space (usable for education, workshops, meetings, exhibitions, events) that has been converted from a vacant factory. With these projects, we are trying to realize the area's potential through activities, recreating a more creative and active city culture and identity.

Keyword: Industrial area; Stock Management; Creative Industry; City Promotion; Comprehensive Planning

INTRODUCTION

Recently in Japan, the urban environment of its industrial cities has been changing due to corresponding dynamic changes in the industrial, economical, and social structure of the country. The "old" type of industrial city is experiencing a gradual decline with the number of their factories and populations decreasing; and this is especially so in industrial-residential mixed-use areas, where factories are disappearing at an incredible

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rate and the cities' themselves are becoming increasingly chaotic. Therefore, a strategy to regenerate these industrial cities is very important.

In general, the objective of modern urban planning theory is to create a comfortable urban environment by ejecting from it the worst aspects of the industrial area, such as pollution. One problem, however, is that industrial technology and the environment are changing, and changing rapidly. Industrial areas now additionally function as a source of economic value, and it is important to integrate this production function into urban spaces from the point of view of job creation.

Before the modern era, the productive function coexisted with the living function in many cities, and recently, a job glut has caused an outflow of population from the local cities in Japan, and it is no longer possible to both work and live in the city. Therefore, we have to "re-claim" industry as local value, and to do this it is necessary to rebrand a city's image evoking a fusion of the industrial and urban.

In this research, we focus on a comprehensive and active planning method, specifically, on how to integrate manufacturing, community development, and city promotion so as to solve this kind of problem in mixed residential-industrial cities, and in particular in Ota Ward, Tokyo, Japan. Ota Ward in Tokyo has small industrial districts, some of which are mixed-use areas.

FRAMEWORK

This research outlines our attempt to establish a framework for a comprehensive planning method, which we have named "creative town making with community development and fabrication" (CTMCDF), by approaching the task from a variety of viewpoints.

First, we attempted to achieve urban regeneration of the industrial city through an integrated planning methodology. Specifically, we took three core approaches, "industrial development", "community development", and "city promotion", and we deliberated on how to link these together.

One of the drawbacks of "sectionalism in Japan, i.e., when one or more urban policies are introduced by the local government, has been pointed out. In Ota Ward, the role of the department in the local government office in relation to CTMCDF is ambiguous, potentially spanning across so many fields (industrial development department, community development department, tourism department etc.), and so the cooperation between each department is not necessarily smooth shows in Figure 1.

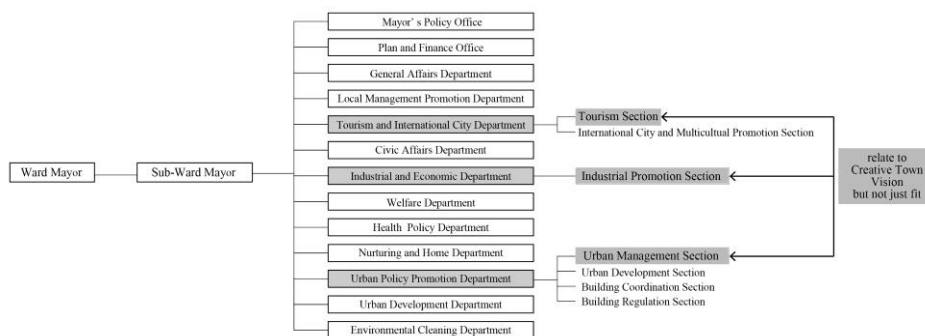


Figure 1: Administration system (department and section chart) in Ota ward, 2015

To overcome these obstacles, we have tried to consolidate and enhance the border-domain programs through public-private-academic partnerships. In detail as illustrate in Figure 2, we have attempted to link each department explicitly to the three programs: (1) Supporting Creative Industry (in industrial development), (2) Stock Management (in community development), and (3) Industrial Tourism (in city promotion). This point is explained further below.

The second viewpoint looks at how the following phase-in frames practically achieve urban regeneration. The four phases are: (1) research of local resources and capital, (2) comprehensive planning, (3) social experiments, and (4) review and examination of the realization of the above-mentioned integration approach.

Recently, a “Creative City Policy” has been introduced in many cities around the world, for example, 69 cities joined the Creative Cities Network organized by UNESCO in 2014. This is a comprehensive approach incorporating culture, art, industry, urban design, etc., but the particular interest expressed by the theme of many cities is centered on art and culture (creative cities are classified by Literature, Film, Music, Crafts and Fork Art, Design, Media Arts, and Gastronomy), and not mechanical fabrication itself. Therefore, what we want to do is put the focus on fabrication and industry.

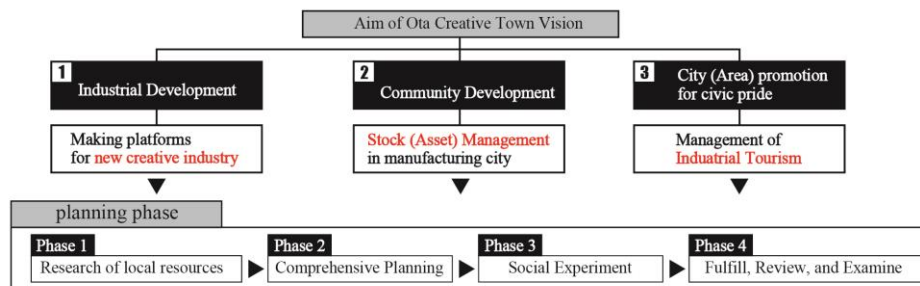


Figure 2: Planning Framework for the Ota Creative Town Vision

HISTORY AND CURRENT SITUATION OF OTA WARD

Ota Ward in Tokyo: History as an Industrial City

The history of the Ota Ward industrial city started with the construction of the Tokyo Gas Omori Factory in 1906, with some areas in OTA being assigned to the Industrial Area under the Urban Planning Act of 1919. At that time, however, not only were normal factories engaged in effective production, but they were at the forefront, with several creative factories beginning to accumulate in the area (e.g. a typewriter factory established together with the residential village, an elevator factory, a glass factory etc.). Further developments of 44 residential areas in OTA ward using the Land Consolidation Method (3,003ha in total), and in particular in the Shimo-maruko Area, established a new industrial city composed of factory blocks and residential blocks. This was followed by the cutting-edge companies that began to arrive around that time.

After the Second World War when large factories began to accumulate in the 1950s, the small and medium size factories also began to accumulate around the former fields or workplaces surrounding the fishing village. At the same time, the pollution

problems associated with factories began to appear near and inside the residential areas. This marked the birth of the so-called "problem of industrial-residential mixture".

As a counter-measure, the policy of "industrial-residential separation" was devised and attempted. Ota Ward tried to move the small factories into the new industrial area on the reclaimed land (Heiwa-jima land [1967], Showa-jima land [1967], Keihin-jima land [1974], and Jonan-jima land [1979]) and in the seaside area. Additionally an area was assigned exclusively for industrial use (in Omori-minami, Higashi-kojiya, Hanedasaahicho, and that reclaimed land in 1973), under the Town Planning and Zoning Act of 1968. Unfortunately, in spite of much effort, the situation did not improve. After the 1980s, the strategic focus shifted towards "industrial-residential harmonization" and factories were built in the so-called "factory apartment" style. Several "factory apartments" were established in the area, but they could never seem to obtain a satisfactory arrangement of the land use structure.

Current Situation in Ota Ward

Nowadays, Ota Ward continues to possess several mixed-use areas (very small factories mixed together with housing areas), but the total number of factories has been decreasing (from 9,177 factories in 1983 to 3,788 factories in 2011, Figure 3), and consequently economic power has been declining as well. After the factory-work came to a halt, new small apartment houses or residences were haphazardly built over that space and the situation only continued to deteriorate. Some factories are still active and can boast of sophisticated capabilities and skill-sets but their working environment is inadequate, being surrounded by too many dwellings, and there are great obstacles to passing the baton that is their technical knowledge onto the next generation, increasingly necessary because of the ageing workforce. Thus, there are at hand several difficult problems that need to be solved.

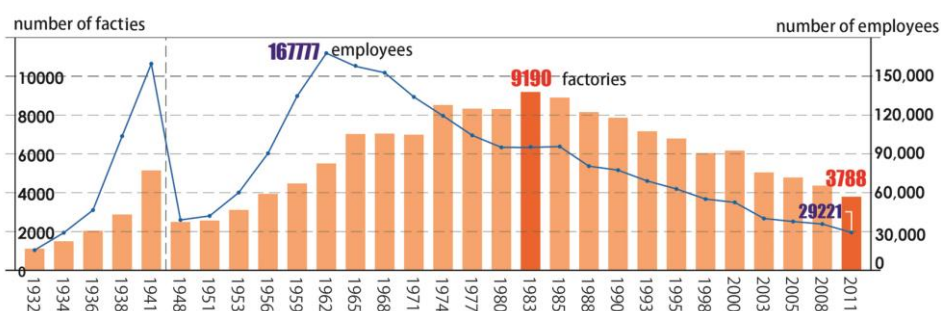


Figure3: Number of factories and workers (Industrial statistics for 2011)

RESEARCH OF LOCAL RESOURCES

Local resource in fabrication: industrial networks

Although the number of factories is decreasing, the remaining small factories do in fact have high technological performance and an industrial culture that accepts orders from the major companies in global business. Even if each is factory itself is quite small and

possesses primarily only specialized techniques (for example, cutting, plating, or polishing), they also participate in a deep cooperative network that exists between the managers of the small and medium size factories, called the “flat contact network” or “bicycle network” (signifying that the diverse factories of the network are at a very short distance from one another), and this network has developed through both formal and informal local interaction.

For example, the existing literature about the Omori-Minami area in Ota ward (Okuma and Nohara, 2010) shows that they have autonomous industrial and social networks in this local area (Figure 4). In Shimo-maruko Area in particular, “Kowa-kai”, which is a local industrial guild organization, operates with approximately 150 small manufacturing companies in Ota Ward having joined. This organization is a real genuine local resource tying together the area and the industries.

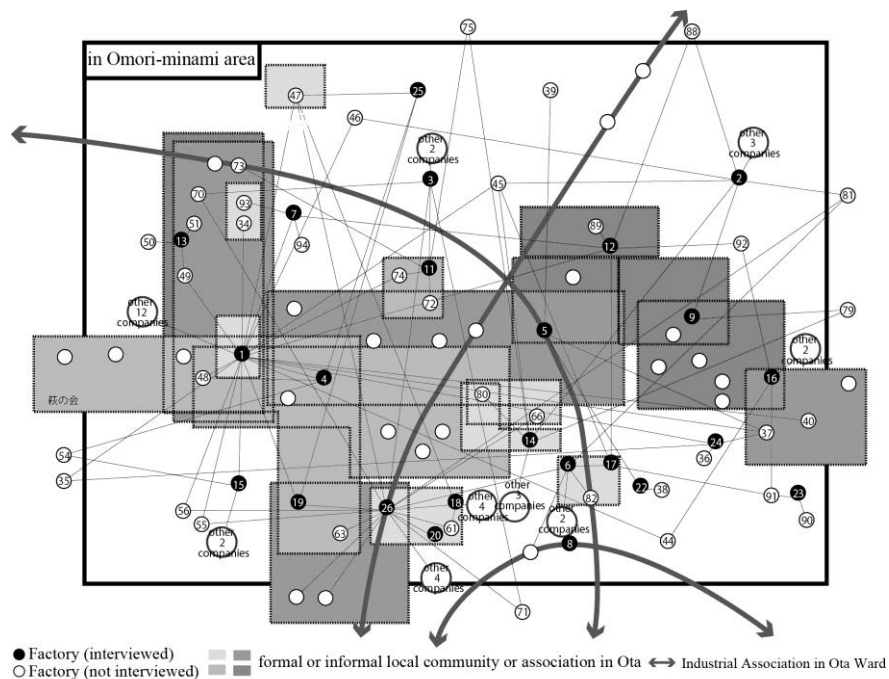


Figure 4: Industrial (small factories) and social network in the local area

Source: Okuma and Nohara, 2011

Stock resource in industrial area

Stock resource: factory as an architectural type

If we re-conceptualize the factories as spatial stocks and asset stocks, we can find the architectural characteristics of a factory: they have the atmosphere of a workspace, have large opening doors, crane facilities for machine import, large-capacity power supply facilities, and so on.

Although there were over 1,100 factories in 1973 in the Shimo-Maruko area, a mixed industrial-residential area in OTA, presently there are under 400 (having been converted mainly into residences or parking); however, there are still quite a few “charming” buildings, which we call “Live-Fab. Buildings”, referring to a certain architectural typology in which the ground floor is for factory use and the higher floors are residential. There are over 200 such buildings in the area.

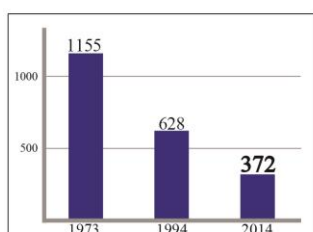


Figure 5: Number of factory buildings in Shimo-maruko, Yaguchi Area

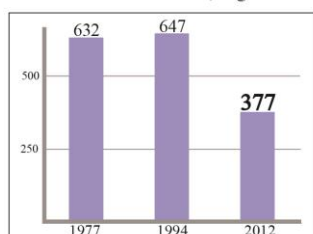


Figure 6: Number of fabrication companies in Shimo-maruko, Yaguchi Area

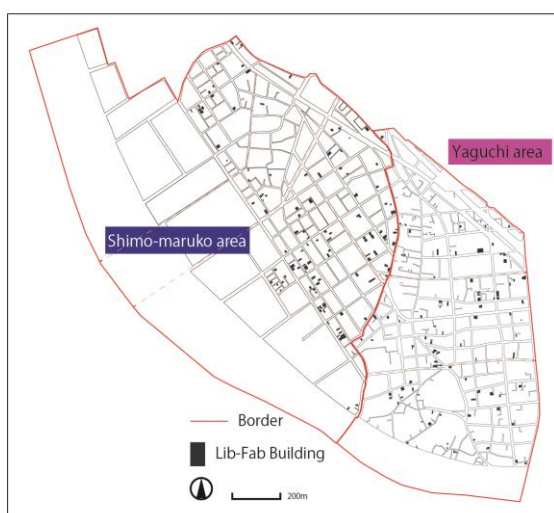


Figure 7: Plotting map of Lib.-Fab. buildings in Shimo-maruko, Yaguchi Area

Source: Ota Creative Town Study Group, 2015

Stock network in industrial area

This area is home to several complicated networks interweaving between fabrication and local life. For example, 35% of land in this area illustrate in Figure 9 belongs to owners who are concerned with factories and manufacturing. Many factory owners are very important players because they have multiple roles, for example, not only acting as the president of a fabrication company, but also as a building and land owner, and even as a resident of the area. Research of the Kowa-kai association has revealed that 82% of factory managers live in Ota Ward, and so they are closely connected to the area display in Figure 8.

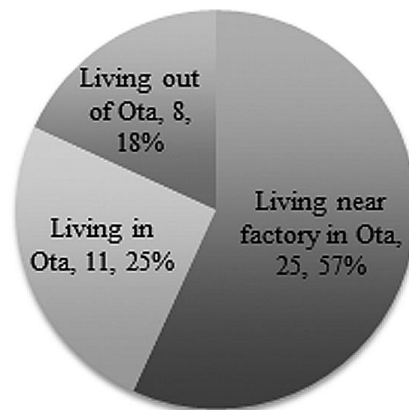


Figure 8: Living situation for factory managers in OTA (n=44)



Figure9: Structure of land-building owning and using in Lib-Fab area in Ota
 Source: Ota Creative Town Study Group, 2015

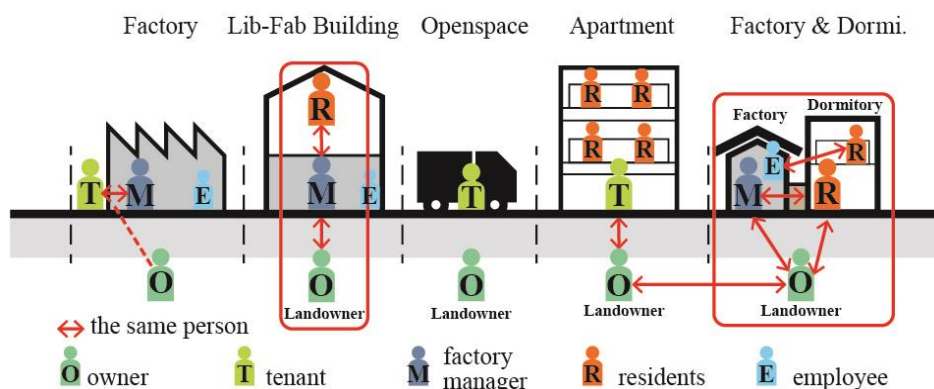


Figure10: Structure of land-building ownership and use in Lib-Fab area in Ota

Resource for industrial tourism

Recently, the demand for industrial plant tours for ordinary citizen has been increasing because it is nowadays impossible to fully understand or grasp the behind the scenes processing of one's desired finished product at the time of purchase. As a result, a new kind of tourism, "industrial tourism" has been experiencing rapid growth.

Furthermore, by considering the whole Ota Ward rather as an undeveloped section of the industrial area, the possibilities for industrial tourism become evident. Ota Ward is a big city with a population of approximately 700,000. It is richly diverse, featuring an upper-class residential area on plateaus, many attractive shopping streets, and the Haneda International Airport, the base of globalization. Seen in terms of industrial tourism, such local variety has definite possibilities for the future.

COMPREHENSIVE PLANNING: OTA CREATIVE TOWN VISION (2011)

Ota Creative Town Vision (2011)

We created the "Ota Creative Town" Vision in collaboration with the Ota Tourist Association and two Universities (Tokyo metropolitan Univ. and Yokohama National Univ.), supported by the local authorities (Ota Ward). Through this Vision, we have aimed at a new solution by creatively reconsidering and investigating the problems and resources of each field ('industrial development', 'community development', and 'city promotion'). To solve these problems we set the following three aims: (1) Create platforms for new creative industries, (2) Expand the base of manufacturing by industrial tourism, and (3) Regenerate attractive urban spaces in the industrial city using Stock (property/real estate) management

(1) Creating platforms for new creative industries : this goal is all about creating new industries by matching fabrication with creative work (for example Art, Design, IT Venture, Medical science). To create products not only for businesses but also for consumers, we want to utilize platforms for idea and information collection and creative networking. More concretely, we have carried out several projects: the "Ota select shop

project" collected attractive products made in the Ota area, the "ART-FACTORY matching project" matched craftsmen with creators, and the "Manufacturing Egg Project" involved making an original capsule toy to bring consumers closer to the actual fabrication process.

(2) City promotion and Expansion of the footprint of manufacturing through an industrial tourism event: this aim not only relates to the growth of manufacturing itself, but also the to the spread of knowledge about fabrication to consumers and the local people who have not been in close proximity to industry before, helping them understand the manufacturing environment and the importance of culture as a source of the city's burgeoning identity. To realize this, we are trying to organize "Ota open factory", an industrial tourism event in which many small factories will be open to consumers and visitors. We have also suggested designating an area (tentatively called "Mono-machi Cafe") for interaction between craftsmen, factory workers, creators, and consumers and locals.

(3) Regeneration of attractive urban space in industrial cities using stock management: here we aim at the enhancement of amenity and comfort in factory spaces in order to allow for pleasant and effect work to be performed and to put vacant stocks (factories and buildings) to a creative use (craft space, community space, atelier, or other creative spaces). We have proposed several projects as follows. "Live-Fab building" will investigate attractive buildings such as small characteristic factories with overhead living space, "Ota real estate project" will consider potential uses of buildings or spaces, and "Fabrication and community development base" (hereafter called Creative Town Lab.) will propose use of vacant space as the core site of other activities.

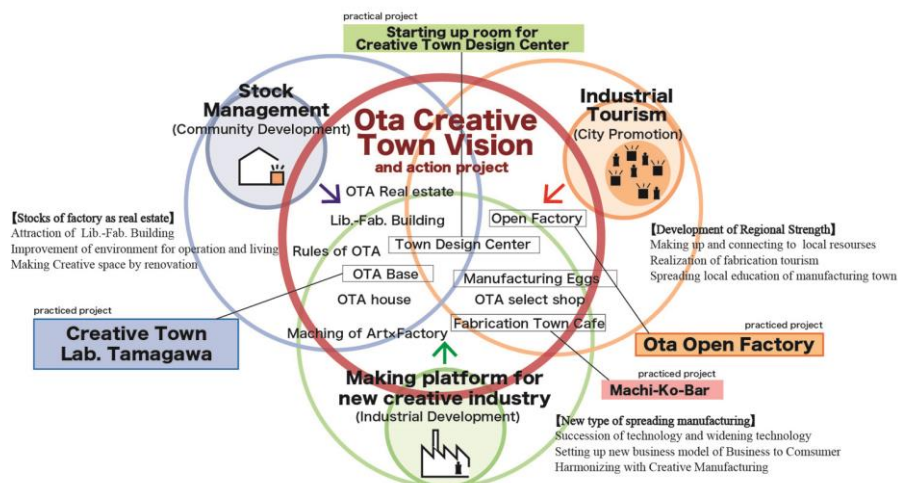


Figure 11: Schematic diagram of Ota Creative Town Vision

Planning Process

The planning processes outlined below were followed to drive forward and practically implement the Ota creative town vision.

(1) Research of industrial spaces in the Ota area : to clarify the charm (product, technique, craftsman, factory architecture, space) as a variety of resources about manufacturing (about total 70 factories), we studied factory spaces and interviewed craftsmen and factory managers. Then, we studied the historic changes of the area and the land use and building stocks of the manufacturing area to understand how to approach the regeneration of the city.

(2) Small social experiments: next, we carried out small-scale experiments (as outlined above) to clarify which were the attractive and important aspects of the area. We planned and carried out the "Ota city walk of the manufacturing area" around factories and surrounding areas in 2009 and 2010, and also developed "Monodukuri Tamago (Manufacturing Egg)" in 2010, a capsule toy product made in Ota with the cooperation of a factory and based on a student's idea. In addition, we announced and displayed these results at an industrial event (OTA INDUSTRIAL FAIR) in Ota in order to solicit further advice and suggestions.

(3) Comprehensive planning ("Ota Creative Town Vision"): for the actions mentioned above we have proposed a vision and plan (Ota creative town vision, 2011) drawn up in "Ota Mono-machi BOOK 2011" (2011). In the plan, the three aims and directions (new industries, industrial tourism, and stock management) and an action plan (the drafting of the project and the practice process) are detailed.

(4) Social experiment and adjustment: Since it has been difficult to immediately carry out and make our vision a reality, we began with several easily executed social experiments: "Manufacturing Egg" (development of new creative products), "Ota Open Factory" (industrial tourism event), and "Creative Town Lab. Tamagawa" (stock management).

Initially the projects were not met with a resoundingly warm welcome by the factory owners and workers, and the community organization was averse to any changes to the present conditions that would occur as a result of the social experiments based on our vision. Nevertheless, we were gradually able to conduct bigger social experiments by accumulating a record of several small successful attempts which acted as proof of concept allowing us to convince the craftsmen, building and factory owners, and the local people of the value of what we were doing. Moreover, these experiments were carried out flexibly and according to each specific situation. For example, the useful vacant space that was discovered while we ran "Ota Open Factory" led to the next social experiment, "Creative Town Lab. Tamagawa.

SOCIAL EXPERIMENTS

As of the publication of this study, the following two projects have been fully completed.

"Ota Open Factory"

One project that embodied our vision was an industrial tourism event, "Ota Open Factory". This is an annual program in which many small factories in the riverside residential-industrial mixed areas, Shimo-maruko, and Yaguchi area, are opened to the

public. At this time, the public can not only visit working factories, but also talk with active craftsmen, observe the manufacturing workshops, join in factory tours, receive authentic goods, and even simply ramble around the area. This event is carried out by the "Ota Open Factory Committee", which is comprised of the "Ota Creative Town Study Group", consisting of the Ota Tourist Association, two Universities (Tokyo Metropolitan Univ. and Yokohama National Univ.), "Kowa-kai", and some individual factory managers.

We have held this event four times (Feb 2012, Dec 2012, Feb 2014, Nov 2014), and although occasionally we have experienced bad weather (snow, typhoon, rain) many guests have participated with about 1,200 people attending the first event and up to about 2,000 people attending the fourth. The guests consisted not only craftsmen or workers in the same trade from other cities, but also local people and those concerned with manufacturing and factories. At the first event 31 companies participated or opened and this more than double by the fourth event with 71 companies participating.

"Creative Town Lab. Tamagawa"

The other project successfully carried was "Creative Town Lab. Tamagawa, which involved the conversion of vacant space (formerly used as factory or office space until several years ago) to active community space for a fabrication town. It was introduced when we were planning the Open Factory Event, and the Ota Tourist Association rented it from the owner and converted it. During planning, we commandeered the area and used it variously as an educational space to learn about manufacturing and absorb information about the city, a workshop space, a meeting or an exhibition space that the size limitations of small factories simply do not allow for, a window of the tour, exhibition space, and a café-bar for social interaction. In particular, we planned this space for events to show the atmosphere of a creative factory town (charming craftsmen, detailed industrial techniques, town history etc.) for local residents. It was used around 30 times per year from December 2013 for events featuring manufacturing craftsmen, workshops for children, and so on. All users were satisfied.

Assessment of this plan and future projects

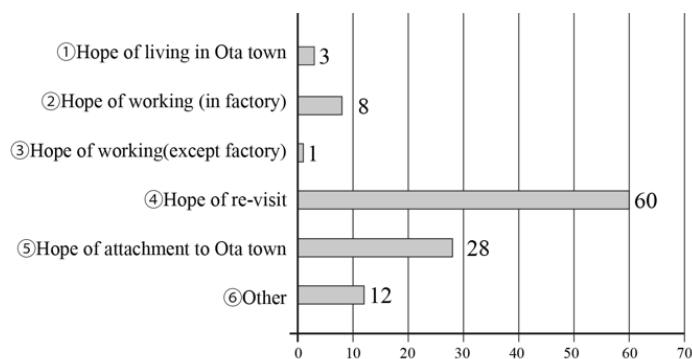
We conducted a questionnaire survey to evaluate the "Ota creative town vision" and some future projects to further the enactment of our vision.

First, 140 participants of the Ota Open Factory Event (the fourth, in November 2014) were surveyed. The question we asked was "What kind of interest do you have in the Ota Open Factory Event". We received many different answers, such as "to talk with the craftsmen" (largest number of answers), "to experience the high technology that a factory of Ota has", "to see the cityscape of the factory buildings" and so on; and from this we understood that the participants had a variety of interests in the event.

In addition, for the question "what would you do in an industrial-residential mixed city", the answers were "support small factories in towns", "raise up a new generation of craftsmen", and "develop original products"; and from this it is clear that manufacturing in OTA is highly-rated and the object of great expectations.

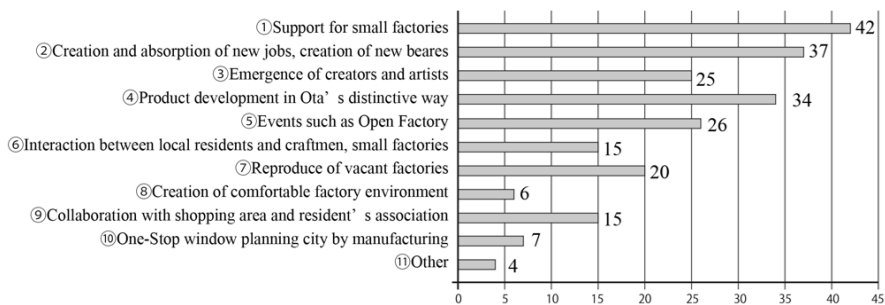
For the factories that were members of "Kowa-kai", we also conducted a separate questionnaire survey concerning their image of the architectural future of their factory (56 answers were returned, a recovery rate of 47%). Although approximately 40% were

satisfied with the current conditions, 36 companies intended to update their factory institutions, and 10 companies intended to expand the open space in their factories; for example, the interchange space, the creative space, the exhibition space, and the rest space. This shows that there is in fact the possibility of space re-arrangement that industry space and city space are related to. The potential of industrial tourism was evident in the acceptance of plant tours by 21 companies. We also understood that most factories expected the entry of a new company including a creator or the venture company.



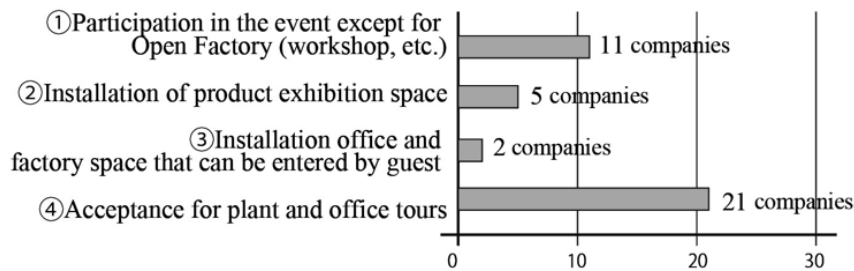
Question for guest in Ota Open Factory 4th (n=140: multiple answer allowed):
 What kind of impression of Ota do you have after event ?

Figure 12: Impression after Open Factory
 (n=140; multiple answer allowed)



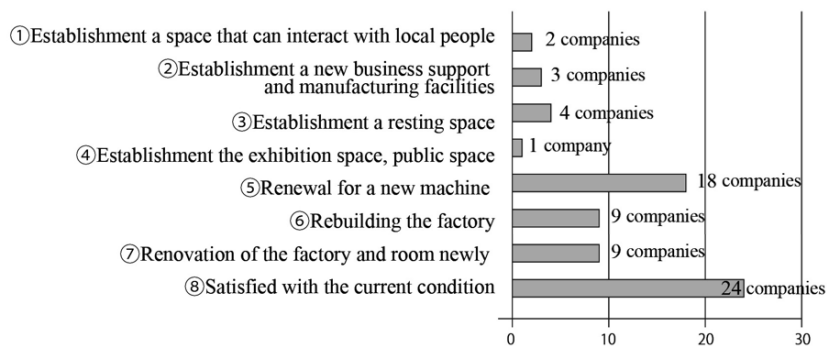
Necessary things for the community development with manufacturing (n=140 :multiple answer allowed)

Figure 13: Necessary Things for Community Development
 (n=140; multiple answer allowed)



Question: Participation intention for factory open events
(n=56: multiple answer allowed)

Figure 14: Intention of Participation in event
(n=56; multiple answer allowed)



Question: Improvement intention for manufacturing environment (n=56: multiple answer allowed)

Figure 15: Intention of Improvement of factory
(n=56; multiple answer allowed)

CONCLUSION

This study aimed at acquiring a methodology for the regeneration of the living environment and industrial spaces of industrial-residential mixed-use cities through comprehensive planning and the implementation of practical projects. We attempted to match an area's potential to a corresponding activity and to forge a new city identity of creativity and action.

First, we investigated local resources in the residential-industrial mixed area for sustainable urban planning. As a result, we found the existence of a number of attractive buildings, including a mixed living and fabrication type, and also the existence of a social industry network or industrial organization at the local level, despite the fact that the number of factories in itself had decreased.

In addition, we drew up the "Ota Creative Town Vision" as an integrated plan and established several projects to realize three aims: (1) Create platforms for new creative industries, (2) Expand the footprint of manufacturing by industrial tourism, and (3)

Regenerate attractive urban space in industrial cities using Stock (property/real estate) management.

After some adjustment, we ran two social experiment projects, "Ota Open factory Event", conducted from the viewpoint of industrial tourism, and "Creative Town Lab. Tamagawa", conducted from the viewpoint of stock management.

Furthermore, through the answers obtained from questionnaire surveys we came to understand that there were a variety of needs and high expectations for manufacturing. Many factories are willing to update their facilities and intend to put the expansive space in the case of update inside at the same time.

This research is still in progress, and through further investigation and inspection we will try to advance the project to the next stage of developing a creative town strategy and rebuilding the industrial space.

ACKNOWLEDGMENT

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MEASURING THE DIMENSIONS AND ATTRIBUTES OF LIVEABILITY OF LOW-INCOME HOUSING COMMUNITIES IN NIGERIA

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Abstract

Housing is a basic human need and its liveability transcends beyond the perimeter of the housing unit. The quality of the living environment is important for an individual's well-being. The factors that contribute to the inhabitants' satisfaction in a living environment are essential inputs in monitoring the success of housing policies of the government. This paper measured the dimensions and attributes of the living environment of the public low-income housing estates in Minna, Niger State. A questionnaire was administered to 400 household heads in the three selected housing estates based on stratified random sampling. 366 questionnaires were returned and the data were analyzed with descriptive statistics and factor analysis. Results showed that residents are satisfied with housing unit and economic vitality, but dissatisfied with neighbourhood facilities, and social interaction was lacking among the residents. Also, residents are apprehensive of their safety. This study recommends an immediate improvement of neighbourhood facilities in these housing estates.

Keyword: Liveability, Low-income housing, Factor analysis, Niger State

INTRODUCTION

Housing remains one of the three most essential needs of man (UN-Habitat, 2006) and it can be described as an integral part of a human frame which should respond to the need of its inhabitants. It encompasses all the auxiliary services and living environment facilities, which are necessary to human well-being. The right to a safe, secure, healthy and inexpensive adequate housing was enshrined in the Habitat Agenda (UN-Habitat, 2001). This global call for human settlement and shelter encouraged the government of nations to intensify efforts to provide housing for their citizens in particular for the low-income populace (Makinde, 2013). Prior to this, Nigeria governments at various times have introduced different housing policies to solve housing deficit problem. Thus, evidences from various studies, show that Nigerians are still under-housed (Nse, 2012; Ademiluyi and Raji, 2008; Makinde, 2013; Ibem and Aduwo, 2012; Aribigbola, 2008). Nevertheless, both federal government and the state governments have continued building housing units for various levels of income groups (low, middle and high-income) in their respective territory. After the independence in 1960, the governments' commitment towards low-income housing is dated back to the First National

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Development Plan (1962-1968). However, there is a lack of mechanism to gauge the success of the government public housing policies or programmes. A successful housing provision does not only depend on merely provision of housing units, but also on the other factors that affects the needs of residents. The failure of many housing projects may be attributed to the lack of knowledge on what determines the liveability of a living environment.

In the recent times, liveability concept has attracted much attention from different disciplines. However, liveability as a concept is an urban planning concept that connotes the ability of a living environment to support human well-being or simply quality of life. Though, the concept of liveability has been said to be difficult to work with due to the imprecise definition (Balsas, 2004; Heylen, 2006; Leby and Hashim, 2010). On a global scale, center for liveable cities Singapore (2011) defined liveability as that city with a good planning that provides a vibrant, attractive and secure environment for the people to live their life, work and play. It encompasses good governance, gives a competitive economy, high quality of life and environmental sustainability. Also, Economic Intelligence Unit (2012) sees liveability as an assessment of which locations around the world provide the best or the worst living conditions. On the other hand, Mercer quality of life survey (2011) examined liveability dimensions which include, among others; political and social environment, education, etc. On global cases, indicators such as country political stability, international relations with other countries and the presence of international schools were given considerations. However, on a community/residential environment level that is the focus of this study, liveability has been made operational. In such studies liveability dimensions include; social, physical, functional and safety elements (Leby and Hashim, 2010). Furthermore, a study from Netherland by Heylen (2006) looked at the dimensions of housing/dwelling quality, physical environment quality, social environment quality and Safety of the neighbourhood. Moreover, Omuta (1988) from Nigeria examined neighbourhood liveability through the dimensions of employment, housing, amenity, education, nuisance and socioeconomic. With these few studies discussed, it is obvious that various definitions and applications as found in the literature centered on the human well-being or the satisfaction of the needs of the people (Balsas, 2004). It is against this background, the liveability dimensions and attributes of public low-income housing estates of Niger State is being measured to monitor the success of the state government housing policy.

AIM AND OBJECTIVES

The overall aim is to measure the dimensions and attributes of the liveability of public low-income housing with respect to the respondents' level of satisfaction with their living conditions. Hence, the objectives are as follows:

- i. To test the reliability and validity of measurement structure of assessing liveability with respect to respondents' satisfaction with their living environment.
- ii. To determine the degree to which the various dimensions and attributes explain liveability
- iii. To determine the residents' level of satisfaction with their housing environments

METHODOLOGY

This study adopts quantitative research approach. The conduct of household surveys was based on stratified random sampling purposely to select various homes in the three public low-income housing estates selected. 400 housing units were surveyed out of 1000 housing units in three different locations (Krejcie & Morgan, 1970). However, 366 respondents (household heads) returned their questionnaires which represents 91.5% response and used for the analysis. The questionnaire items measurement was based on 5-point Likert scale (Marques *et al.*, 2015; Mohit and Hannan, 2012). The questionnaire instrument had six sections; the first section was on the socioeconomic characteristics of the respondents, the other five sections focused on the dimensions of liveability that includes economic vitality, housing unit characteristics, social environment, neighbourhood facilities and safety environment. Prior to the conduct of the household survey in the study area, a pre-test of the questionnaire instrument was conducted, and the feedback incorporated into the final version of the questionnaire.

VARIABLE DESCRIPTIONS

From the extant literature; quite numbers of variables were identified to have been used to determine the liveability based on the interest and focus of the study. The variables of socioeconomic characteristics are commonly variables and this forms the first category of the variable used in this study, and these are; age, gender, marital status, household size, indigene-ship, education, employment status, and number of working class, monthly income, length of stay and tenure status. The other category of variables is related to the assessment of liveability of the living environment as found in many studies and summarized in the Table1 below;

Table 1: Dimensions associated with liveability assessment in different studies

Authors	Liveability dimensions	Focus
Omuta (1988)	Employment, Housing, Amenity, Education, Nuisance and Socioeconomic	Study on the quality of urban life and liveability
Balsas (2004)	Safe, Clean, Beautiful, Economically vital, Affordable to a diverse population, Efficiently administered, Functional infrastructure, Ample parks, Effect public transportation, Interesting cultural activities and Sense of community	The study explored urban center liveability
Chaudhury (2005)	Consumer goods, Utility services, Housing affordability, Social Security and Environmental Conditions	Comparative study on City liveability in Bangladesh
Heylen (2006)	Dwelling unit, Physical Environment, Social Environment and Safety	Social Housing Liveability
Betanzo (2009)	Connectivity, Accessibility, Mixed use and Density	Exploring city density liveability relationships
Leby and Hashim (2010)	Social, Physical, Functional and Safety dimensions	Neighbourhood liveability study in Malaysia
Asiyanbola <i>et al.</i> (2012)	Neighbourhood Facilities; Road Quality, Garbage Collection, Public Transport, State of Cleanliness, Street Light, State of Security, Crime Level, Water Supply, Shops, Interpersonal relationship, School Quality, Drainage System, Power Supply and General condition	Comparative study of two neighbourhoods liveability in Ogun state, Nigeria

Namazi-Rad <i>et al.</i> (2012)	Home, Neighbourhood, Services, Entertainment, Work & Education, and Transport	Experimental determination of perceived liveability
Buys <i>et al.</i> (2013)	Individual dwelling unit, Building complex domain, Community domain	Inner core city liveability
Saitluanga (2013)	<u>Objective dimensions</u> Economic, Social, Household, Accessibility. <u>Subjective dimensions</u> Socioeconomic Environment, Physical & Infrastructural Environment	Spatial pattern of urban environment
Lawanson <i>et al.</i> (2013)	City governance, Safety & Security, Cultural identity & Global relevance, Environmental indices and infrastructure	African City liveability conceptualization

DATA ANALYSIS

Descriptive statistics

The descriptive statistical analysis was conducted, and it produced the proportions and percentages for the eleven variables of socioeconomic characteristics of the respondents. Also, obtained are the average satisfaction scores for each construct of measures of liveability for all items of the constructs. This helps in identifying the level of satisfaction with the specific individual item. All these analyses were carried out in the statistical package for social sciences (SPSS) version 22 with analysis of moment structure (AMOS) version 22.

Item Reliability Test

The construct items were tested for reliability and found to have reliable Cronbach's alpha reading above 0.70 except safety-environment and social interaction constructs which is less than 0.70. In the case of safety-environment, the seven items achieve 0.50 which is less than a tolerable limit value of 0.60 (Creswell, 2011). However, Pallant (2007) opined that Cronbach's alpha above 0.70 is preferable, and when the researcher obtained less than 0.70, the items measuring the construct should be scrutinized to know which item or items are not measuring what ought to be measured and may be considered for recoding in case of the negatively worded item or removed. It is against this background that four items from the construct "safety-environment" were removed, leaving three items in the construct with Cronbach's alpha 0.916. On the other hand, the construct "social interaction" violates the model assumption reliability having recorded negative values, and the construct was removed from the initially hypothesized model. The exact alpha values for each of the variables are as shown in Table 2 below;

Table 2: Variables internal consistency reliability Cronbach's alpha values

Variables	No of Items	No of Items deleted	Cronbach's Alpha
Housing unit characteristics	13 Items	None	0.932
Economic vitality	6 Items	None	0.866
Neighbourhood facilities	11Items	None	0.715
Safety environment	7 Items	4 items	0.916
Social interaction	3 Items	All	-0.947

Exploratory factor analysis

The exploratory factor analysis with the principal component method was conducted purposely to identify the key dimensions of liveability as evaluated by the respondents. This dealt with multi-collinearity issues that would have arisen due to intercorrelations among the indicators used in measuring the housing estates liveability in the survey. From the extant literature, correlation matrix should be inspected to check for the singularity of items or indicators. Each indicator should have at least 0.2 percent correlation with another indicator. This relationship shows that they are both contributing in measuring a particular latent construct. An item or indicator without such attributes should be deleted (Andy, 2009; Eugenie *et al.*, 2014).

RESULTS AND DISCUSSIONS

The socioeconomic characteristics of the respondents

The results of the descriptive statistical analysis showed that the majority (79%) of the participants are men. The majority (60.6%) is at the age of 31-50years; the estimated average age is 43years and close to 94% obtained higher education. Nearly 70% are gainfully employed in both government and private sectors. 85% of the respondents are married, and 62% had a household size of five persons and above. The estimated average household size stood at 7. And 58% of these families have only two persons working. However, 63% earned close to N100, 000.00 (USD500) per month, 32% about N200, 000.00 (USD1000) monthly and the remaining 5% earned above N200, 000.00 monthly. Furthermore, 76% represents owners' occupied, and 24% are renters. Also, on the length of stay 73% indicates less than ten years while others have lived there between ten years and thirty years. Also, 75% are from the state, and the other 25% are from other states of Nigeria. Based on the above, the participants in the survey could be said to have enough knowledge of their neighbourhood environment and, therefore, the data emanated from them could be regarded as reliable.

Overall satisfaction level with liveability dimensions

The pattern of responses from the residents of the three housing estates seems similar. The mean overall satisfaction for housing unit characteristics, neighbourhood facilities, safety-environment, economic vitality and social interaction are as shown in Table 3. The residents in M.I. Wushishi estate, Bosso estate and Tunga low-cost were satisfied with their housing unit characteristics with average scores of 3.10, 3.54 and 3.58 respectively. A similar finding on dwelling unit was reported in the study of private low-cost housing in Malaysia by Salleh (2008). Also, the residents' level of satisfaction with economic vitality shows contentment with average scores of 3.18, 3.37 and 3.71 in M.I. Wushishi, Bosso estate and Tunga low-cost respectively. However, in all the three housing estates the residents expressed low satisfaction on the neighbourhood facilities and social interaction. This finding corroborates the findings of the study of the low-cost residential environment in Malaysia by Ismail *et al.* (2015). Similarly, residents of M.I. Wushishi and Bosso estates expressed low satisfaction for the safety environment with average scores of 2.82 and 2.93 respectively, whereas, residents in Tunga low-cost were satisfied with safety in their neighbourhood with a mean score of 3.16.

Table 3: Overall satisfaction with liveability dimensions

Liveability dimensions	M.I. Wushishi	Bosso Estate	Tunga Low-Cost	Overall Mean
Housing unit characteristics	3.10	3.54	3.58	3.40
Neighbourhood facilities	2.62	2.60	2.91	2.71
Safety environment	2.82	2.93	3.16	2.97
Economic vitality	3.18	3.37	3.71	3.41
Social interaction	2.65	2.70	2.57	2.64

Satisfaction with housing units

Evidence from Table 4 shows residents of M.I. Wushishi estate raised concern about the road network, parking lots, cleanliness of the estate and overall housing condition. The average satisfaction scores range between 1.91 and 2.88 suggesting their dissatisfaction of these indicators of housing unit liveability. Meanwhile, residents of Bosso estate were only dissatisfied with road network (mean value of 2.98). However, residents in Tunga low-cost are satisfied with all housing unit characteristics. It can be inferred that housing units in Bosso estate and Tunga low-cost appeared more acceptable than the M.I. Wushishi housing units. In these two housing estates, the mean values obtained are higher than the mean values obtained in the responses of the residents of M.I. Wushishi estate.

Table 4: Satisfaction with housing units

Housing unit characteristics	M.I. Wushishi	Bosso Estate	Tunga Low Cost
House ventilation	3.58	3.83	3.79
House size	3.47	3.77	3.64
Living area size	3.46	3.66	3.69
Dining area size	3.20	3.67	3.27
Size of bedroom	3.44	3.72	3.62
Size of kitchen	3.16	3.59	3.52
No of Bathrooms	3.14	3.50	3.43
No of toilets	3.16	3.44	3.42
Affordability	3.53	3.71	3.69
Road network	1.91	2.98	3.58
Parking lots	2.54	3.17	3.47
Cleanliness of the estate	2.91	3.53	3.75
Overall housing condition	2.88	3.51	3.72

Satisfaction with neighbourhood facilities

It is evident from overall mean neighbourhood facilities satisfaction scores of 2.62, 2.60 and 2.91 (Table 3); that the respondents were generally dissatisfied with neighbourhood facilities in the three housing estates investigated. This contrasts the findings of the study of residents' satisfaction with public housing in Abuja by Ukoha and Beamish (1997).

However, Table 5 shows the average score values for each of the attributes used in measuring neighbourhood facilities satisfaction as rated by all the respondents. It is evident that the respondents in the three housing estates investigated were satisfied with children education services, healthcare services and garbage collection in their neighbourhoods. The satisfactions mean values ranged between 3.26 and 3.89 (Table 5). These findings provide support for previous study by Salleh (2008) indicating that residents of private low-cost housing of Penang and Terengganu in Malaysia were satisfied with neighbourhood facilities such as schools, health center and garbage disposal. On the other hand, the residents of Bosso estate and Tunga low-cost were satisfied with public transport services with mean scores of 3.31 and 3.73 respectively but, M.I. Wushishi housing estate residents' were not satisfied with public transport services as the mean score of 2.74 was obtained. The mean scores obtained for water supply revealed that only residents of Tunga low-cost were satisfied with a mean score of 3.06 while residents in M.I. Wushishi and Bosso estates were dissatisfied with water supply with average scores of 2.55 and 2.51 respectively. On the electricity supply, Bosso estate seems to be at the disadvantage with 2.57 mean scores compared with mean scores of 3.26 and 3.04 for M.I. Wushishi estate and Tunga low-cost respectively. However, it is apparent from Table 5 that respondents were dissatisfied with attributes related to the availability of open/green space, shopping centers & community hall, the nature of road and drainage system condition. It can be inferred from the results that respondents were only satisfied with about 45% of the total neighbourhood facilities attributes investigated. In these findings, it can see that it is consistent with the previous study's findings showing lack of access to basic neighbourhood facilities in public housing estates in Lagos and Ogun States, Nigeria (Ilesanmi, 2012; Ibem and Aduwo, 2013).

Table 5: Satisfaction with neighbourhood facilities

Neighbourhood facilities	M.I. Wushishi	Bosso Estate	Tunga Low Cost
Children educational services	3.51	3.72	3.85
Health care services	3.62	3.29	3.76
Garbage collection	3.26	3.47	3.89
Water supply	2.55	2.51	3.06
Electricity supply	3.26	2.57	3.04
Public transport	2.74	3.31	3.73
Open/green space	1.80	1.69	1.66
Shopping centers	1.83	1.50	1.64
Community Hall	1.92	1.98	1.99
Nature of road	1.95	2.31	2.99
Drainage system	2.41	2.21	2.40

Satisfaction with safety

Table 6 shows the mean satisfaction scores for all safety attributes. The respondents were satisfied with only three out of seven safety attributes measured. They are safety from

crime, safety from accident and property safety. These three attributes indicate mean satisfaction scores above 3.00 out of possible 5.00 points. Evidently, respondents are not satisfied with police protection and street lighting. Also, it is evident that there is a lack of provision in terms of firefighter (fire brigade) and vigilante protection in the neighbourhoods.

Table 6: Satisfaction with safety environment

Safety environment	M.I. Wushishi	Bosso Estate	Tunga Low Cost
Safety from crime	3.13	3.87	3.95
Safety from accident	3.63	3.92	4.06
Property safety	3.30	3.94	4.03
Vigilante protection	2.82	2.38	2.53
Police protection	2.65	2.28	2.90
Fire brigade	1.65	1.83	2.75
Street light	2.60	2.30	1.92

Satisfaction with economic vitality

It is evident that the respondents are satisfied with their economic vitality/liveliness with mean values ranging from 3.10 to 3.90 in all the three housing estates. This means that respondents are satisfied with what they are earning and not affected either by paying a housing loan or being a renter. However, residents of M.I. Wushishi were less satisfied with their access to public transport (Table 7).

Table 7: satisfaction with economic vitality

Economic vitality	M.I. Wushishi	Bosso Estate	Tunga Low Cost
Household monthly income	3.14	3.49	3.82
Daily cost of transportation	3.10	3.39	3.83
Rental value	3.47	3.90	3.71
Loan repayment	3.63	3.88	3.65
Access to public transport	2.98	3.31	3.82
Standard of living	3.10	3.12	3.31

Satisfaction with social interaction

Table 8 indicates that there is good communication between neighbours in all the three housing estates investigated. However, there is a lack of voluntary activities in all housing estates selected. The average scores of the responses indicates 1.58 (M.I. Wushishi), 1.86 (Bosso estate) and 1.55 (Tunga low-cost). As a result, there is the lack of participation.

Table 8: Satisfaction with social interaction

Social interaction	M.I. Wushishi	Bosso Estate	Tunga Low Cost
Communication between neighbours	3.86	3.82	4.03
Voluntary activities	1.58	1.86	1.55
Level of participation	2.36	1.89	1.87

Exploratory factor analysis

Based on the inspection of the initial correlation matrix, two items of housing units are highly correlated with the value of 0.928, then one was deleted. Following this was the Kaiser-Meyer-Okin (KMO) and Bartlett's Test for adequacy of sample size for factor analysis, the result shows that the sample is adequate. This KMO is suggested to be above 0.5 and for Bartlett's significant level should be less than 0.05. Both criteria were met as the value obtained for KMO is 0.917 and for Bartlett significant level, the value is 0.000. The result shows no singularity problem, although the determinant of multicollinearity value of less than 0.00001 was not met, but it is not severe since the correlation values of the exogenous variables are less than 0.9 (Eugenie *et al.*, 2014). Also, based on communalities items with a value less than 0.5 were dropped. However, the total variance explained based on initial Eigenvalues of 1 with four factors extracted, gives to a cumulative of 66.868% (Table 9).

Table 9: Total variance explained from factor analysis

Component	Total Variance Explained								
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10.229	42.622	42.622	10.229	42.622	42.622	5.716	23.816	23.816
2	2.711	11.296	53.918	2.711	11.296	53.918	4.364	18.183	41.999
3	1.756	7.315	61.233	1.756	7.315	61.233	4.253	17.721	59.720
4	1.352	5.634	66.868	1.352	5.634	66.868	1.715	7.147	66.868

Extraction Method: Principal Component Analysis.

CONCLUSION

This study investigated and measured the extent to which residents in the three public low-income housing estates in Minna, Niger State, Nigeria perceived the liveability of their housing estates. The liveability dimensions and attributes of public low-income housing neighbourhoods were established through the extant literature. From the data analysis, four constructs of liveability dimensions and attributes were found to satisfy both internal reliabilities and construct validity (Table 2). Also, finding showed that the four factors extracted with an Eigenvalues of 1 explained about 67% variance of liveability dimensions of public low-income housing estates investigated, this could be said to be substantial (Table 9).

On the whole, the residents in all the three housing estates were satisfied with housing unit characteristics and economic vitality. Although there are a few attributes of these dimensions that the residents were dissatisfied with, such as the road network in both M.I. Wushishi and Bosso estates, others attributes in M.I. Wushishi estate is parking lots, cleanliness of the estate and overall housing conditions.

Also, findings showed that residents in the three housing estates were unsatisfied with the provision/supply of water, open/green space, shopping centers, community hall, nature of roads and drainage system in the housing estates. Despite this, residents were

satisfied with few neighbourhood facilities which includes; children educational services, healthcare services, garbage collection and electricity supply with the exception of Bosso estate where residents were dissatisfied with electricity supply. Also, respondents were satisfied with public transport in both Bosso estate and Tunga low-cost while residents of M.I.Wushishi estate felt dissatisfied.

On the safety dimensions, respondents in all the three housing estates investigated affirmed their safety from crime, accident, and they are confident of their property safety. However, they express low satisfaction on police protection, vigilante protection, fire brigade availability and street lighting. These are all important in securing the neighbourhoods against any attack.

Moreover, there is the lack of social interactions among the residents of these three housing estates investigated; however there is good communication between neighbours. This lack of social interactions may not be unconnected with the lack of neighbourhood facilities like open space/ recreation ground.

Conclusively, with evidence from the data analyzed, government efforts to provide shelter for the low-income groups in the state has been successful in terms of housing unit and economic livelihood (economic vitality). The indicator of this success is reflected in the level of respondents' satisfaction where 68% of all respondents were satisfied with both housing unit and economic livelihood. However, the respondents' demographic data analysis showed that average household size is seven (7). The policy implication of the above is that while the government continues the provision of affordable housing, it is recommended to increase the development of three bedrooms and above rather than the current policy of developing more of two bedrooms.

In this study, neighbourhood facilities have been identified as inadequate in all the three housing estates. The inadequacy of neighbourhood facilities affects the quality of life negatively and, as a result, the residents were dissatisfied. This study, therefore, recommends proper monitoring by the public housing development agency in the state to ensure that neighbourhood facilities of high quality are delivered along with housing units. And where the neighbourhood facilities are delivered, there is a need for collaboration between government agency in charge of its maintenance and the residents in that neighbourhood to fashion out maintenance strategies. Besides, the current situation in these housing estates needs to be improved, and the least in the liveability profile is M.I. Wushishi estate, therefore, the upgrading/improvement of the neighbourhood facilities should commence there.

Also, security is one of the keys to liveability of the living environment; therefore, the current police divisions in housing estates should be made functional. They should be more on surveillance (patrol) to prevent crimes of any sort. Further, street lights contribute to safety in the neighborhoods, especially in the night. Provision of street lights in all the three housing estates investigated is recommended. It is also important to have firefighter district units for easy access in a case of a fire incident.

As discussed above, the low level of social interaction among the dwellers of these housing estates may not be unconnected with the lack of outdoor space for informal contact among residents. This study, therefore, recommends that outdoor spaces such as open space, children's playground, and shopping centers should always be planned with such large estates. This will encourage social interaction, and it will bring about

community association that will help to create safety in the housing estates, and community participation in matters affecting their living environment.

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AN INVESTIGATION ON THE RELATIONSHIP BETWEEN LAND USE COMPOSITION AND PM₁₀ POLLUTION IN ISKANDAR MALAYSIA

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Abstract

This paper discusses the relationship between land use composition and the degree of air pollution, specifically PM₁₀, in Iskandar Malaysia. Aspiring to be a low carbon region and a smart city, Iskandar Malaysia has to meet the social and economic needs of its growing population while taking care of all the environmental challenges that come with rapid urbanization. The intermittent regional haze episodes in the past years have shrouded this region with particulate matters including PM₁₀, but the major cause of the haze was extensive agricultural open burning rather than land use change. Since there is no doubt land use change itself can be a significant contributor to local PM₁₀ concentration, separating PM₁₀ caused by the local (land use change) source from that of the regional source would enable us to investigate the trend in local PM₁₀ pollution level. Therefore, a study on the Iskandar Malaysia's PM₁₀ readings for the years 2002, 2006 and 2008 was carried out with the aim to identify the relationship between land use composition and PM₁₀ concentrations. The background concentration of PM₁₀ was extracted by using the base flow separation process commonly used in the hydrograph study. The extracted background concentration was then interpolated with the Terra MODIS level 2 product to identify the PM₁₀ concentration for the whole Iskandar Malaysia region, spatially. Since data for land use changes are compositional data in nature, where the percentages of different land use coverages always add up to unity, the barycentric or ternary plot had been used to investigate the relationship between PM₁₀ concentrations with the land use composition (urban:agriculture:forest) in Iskandar Malaysia. The results show that air quality as represented by PM₁₀ concentrations are inevitably linked to the land use changes at the local level notwithstanding the more noticeable but intermittent influence of the regional haze episodes. The degree of air pollution is noticeably controlled by the percentage of urban land use with PM₁₀ clearly affected by the size of commercial area.

Keyword: PM₁₀; land use composition; remote sensing; Iskandar Malaysia

INTRODUCTION

Particulate matter is often condemned as an agent that negatively affects local climate and health. Ramanathan and Carmichael (2008) stated that black carbon warmed the climate in two ways. The particulates warm the air by absorbing sunlight and generate heat in the atmosphere when suspended in the air. This affects regional cloud formation and precipitation patterns. The climate effects of this warming agent were found to be strongly regional because black carbon remained in the atmosphere for only one to four weeks.

Iskandar Malaysia had faced air pollution from both regional source and local emissions. Transboundary pollution faced by this region is the haze episodes that intermittently shroud Southeast Asia since 1972. Focusing on local emission, this study considered the regional sources of air pollution as noise. Separating locally emitted PM₁₀ from the transboundary pollution would enable us to clarify the relationship between local particulate matter emission and land use changes. Geo-information is a good platform to study particulate matter through its spatial perspective. The presence of particulate matters best indicated using PM₁, PM_{2.5}, PM₄ and PM₁₀ concentrations. Since this study focuses on PM₁₀, Aerosol Optical Depth product of Moderate Resolution Imaging Spectroradiometer (MODIS AOD) were used to verify the local particulate matter pattern, while land use changes were detected using satellite images, Landsat Thematic Mapper (from year 1984 to 2008). Based on the monitoring data and ambient air quality studies, several large cities in Malaysia are facing high level of air pollutants that are not always at acceptable levels (DOE, 2002). Following this, the Department of Environment (DOE) Malaysia adopted the current Air Pollutant Index (API) standards in order to revise their old index system in 1996. The basis for the interpretation of the API had been explained in the Malaysian Ambient Air Quality Guidelines (Table 1: The “safe levels” for the listed concentration pollutant). Highlighted in this study, the average threshold limit for PM₁₀ are 150µg/m³ and 50µg/m³ for 24-hour and 1-year averaging time respectively.

Table 1: Malaysian ambient air quality guidelines

Pollutant	Averaging Time	Malaysia Guideline	
		ppm	µg/m ³
Particulate Matter (PM ₁₀)	24h	-	150
	1 year	-	50
Carbon Monoxide (CO)	1h	30	35
	8h	9	-
Nitrogen Dioxide (NO ₂)	1h	0.17	320
	24h	0.04	10
SulphurDioxide (SO ₂)	1h	0.13	350
	24h	0.04	105
Ozone (O ₃)	1h	0.1	200
	8h	0.06	120

Source: Department of Environment, Malaysia (2002)

Transboundary Pollution vs. Local Emissions

There have been many discussions among researchers on the sources of air pollution. At this juncture, it is important to differentiate between transboundary pollution and local emissions. According to Nguyen (2010), air pollution sources included both local emissions and long-range transported pollution (or transboundary pollution).

Transboundary pollution was defined as atmospheric pollutants transported over huge distances, which caused negative impacts on the environment of receptor sites. Local emission sources can be minimised or controlled, whereas transboundary pollution affected and challenged regional policies and regulations. The possible types and factors of transboundary pollution were listed in Table 2. Transboundary pollution could also be triggered by a dust storm, wildfires, agriculture burning or even anthropogenic emissions.

Table 2: Type and events of transboundary pollution.

Pollution source	Receptor site	Source site	Reference
Dust storm			
Dust storm	Taiwan	Inner Mongolia in northern China	Liu <i>et al.</i> , 2009
Dust storm	Beijing, China	Desert regions of Mongolian and northern China	Zhang <i>et al.</i> , 2009
Dust days	Beijing	-	Wang <i>et al.</i> , 2006
Dust storm	French Alps	Sahara desert	Aymoz <i>et al.</i> , 2004
Anthropogenic pollution			
Anthropogenic pollution	Taiwan	Mainland China	Junker <i>et al.</i> , 2009
Anthropogenic pollution	Taiwan	Mainland China	Lin <i>et al.</i> , 2005
Anthropogenic pollution	Jeju island, Korea	China	Nguyen <i>et al.</i> , 2009
Biomass burning			
Wildfire; agriculture burning	Helsinki, Finland	Eastern Europe (Russia, Belarus, Ukraine)	Niemi <i>et al.</i> , 2009
Biomass burning	UK	Russia	Witham and Manning, 2007
Biomass burning	Aveiro, Portugal	Different inland regions of Iberian Peninsula	Pio <i>et al.</i> , 2008
Forest fire burning	Missoula, Montana, USA	Western Montana, USA	Ward <i>et al.</i> , 2006
Biomass burning	Washington, USA	~200 km on eastern	Jimenez <i>et al.</i> , 2006
Forest fires	Rondonia, Brazil	Washington State Rondonia	Graham <i>et al.</i> , 2002
Biomass burning	Seoul, Korea	Korea and China	Kang <i>et al.</i> , 2004
Biomass burning	Kuala Lumpur, Malaysia	Indonesia	Fang <i>et al.</i> , 1999
Biomass burning	Kuala Lumpur, Malaysia	Southern Sumatra and Kalimantan, Indonesia	Abas <i>et al.</i> , 2004
Biomass burning	Singapore	Indonesia	See <i>et al.</i> , 2006
Biomass burning	Brunei Darussalam	Indonesia	Radojevic and Hassan, 1999

Source: Nguyen (2010)

Haze that shrouds Southeast Asian annually is often being condemned as the main factor of degrading air quality in this region. As the criticism continues, we have forgotten that local emission is also one of the contributors on this matter. Particulate matters emitted by urban activities area constant source of pollution, while haze episodes are intermittent. Coal burning was the principal source of particulate matter emissions and air pollution emissions. Haq and Schwela (2008) stated that in most urban areas in Asia,

the most important sources of air pollution were from motor vehicles, particularly those fuelled by diesel fuel and two stroke engines. The largest motorcycle fleet in the world was found in the Asian region since motorcycles were the cheapest mode of individual motorised transportation for the expanding working class in Asia. The backyard burning of refuse (garbage and biomass) still created noticeable and perhaps considerable air pollution. Street cooking was another source of concern, which was important in many urban areas. Therefore, the stated reviews proved that the blame of air pollution and particulate matter emission was not on the intermittent haze episode alone.

Local emission from Iskandar Malaysia may be related to its land use composition trend, which indicates heavily industrialised urban area with higher private vehicles dependency. Therefore, this research was formulated to identify the relationship between land use composition and air quality (PM₁₀). This may help Iskandar Malaysia to control local emission through a proper land use management. As the study focused on rapid urban growth in Iskandar Malaysia, the important air pollutant parameters considered is PM₁₀. PM₁₀ was mainly emitted by industrial and transportation activities, which were considered as main urban activities.

In addition to local emissions, urban air quality may also be affected by global, regional or transboundary pollutants. However, the scenario of air pollution in Malaysia's urban area is likely triggered more by local emissions since transboundary pollution occurred intermittently. Results of an analysis by Ling *et al.* (2010) showed that the number of unhealthy days had a significant and strong relationship with urban land uses in Kuala Lumpur. The finding was contrary to the local party's argument, which strictly blamed the high concentration of air pollutants in the Malaysian capital on forest fires in a neighbouring country (haze). The findings showed that local emissions of PM₁₀, through urban activities, played a big role in the degradation of air quality in Malaysia.

Emissions from mobile sources were a major source of air pollution, which contributes to at least 70 to 75 percent of total air pollution. Behind mobile sources, emissions from stationary sources generally contribute 20 to 25 percent, while open burning and forest fires contribute approximately 3 to 5 percent. A study by the Department of Environment Malaysia (1996), showed that motor vehicles contributed 82 percent of emission towards air pollution. Other sources contributing to air pollution were power stations (9 percent), followed by industrial fuel burning (5 percent), industrial production processes (3 percent), domestic and commercial furnaces (0.2 percent) and open burning at solid-waste disposal sites (0.8 percent).

Therefore, the blame of degradation of air quality in Malaysia should not be put on transboundary pollution alone. Local emission contribution to the degrading air quality should be taken seriously, since these emissions are not intermittent but continual. In addition, while transboundary pollution is not to be dealt with at a local level, local authorities in Malaysia could control local emissions. Therefore, local policies should seriously focus on lowering local emissions by promoting a low carbon lifestyle, green industries and other appropriate measures.

METHOD

Two main variables of this study are air pollution as represented by PM₁₀ concentrations and land use changes. As shown in Figure 1, these variables had been through several

processes in order to clarify the relationship between air pollution and land use composition in Iskandar Malaysia.

The air pollution involves two types of data which are *in situ* data; retrieved from Department of Environment, Malaysia (DOE), and spatial data; MODIS Aerosol Optical Depth data. Due to the limited number of monitoring stations, DOE's *in situ* readings were used to interpolate with MODIS Aerosol Optical Depth value. This process is important to comprehensively estimate concentrations for the whole Iskandar Malaysia, spatially. On other side, clarification of land use changes involves two types of data which are land use database; accessed from the Iskandar Region Development Authority, and LANDSAT Thematic Mapper satellite images; retrieved from the United States Geological Survey. Land uses had been extracted from those satellite images through supervised classification technique. The land use changes had been investigated by calculating the percentage of accretion changes using the change detection technique. Those processed data; air pollution and land use data, were used in the analysis process. The ternary plot technique was used to identify the relationship between land use composition and air pollution level. Through those processes and analysis, the relationship between those variables explains the local air pollution scenario in Iskandar Malaysia.

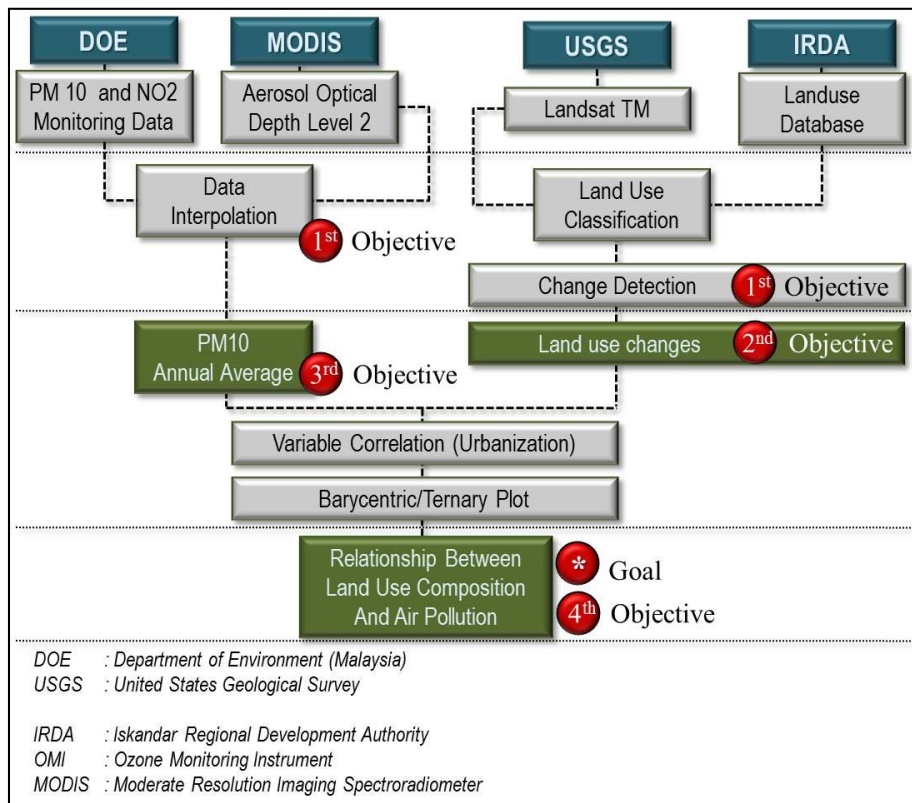


Figure 1: Method adopted in this study

PROCESSED DATA

As mentioned above, there were several data that had been processed which included *in situ* data; DOE's monitoring stations data (PM₁₀), satellite images; LANDSAT Thematic Mapper (1984-2008), and aerosol spatial data; MODIS Aerosol Optical Depth (2002-2008). Those data were required to show the significance of the relationship between particulate matter and land use changes.

MODIS Aerosol Optical Depth (2002-2008)

For the past several years, the air quality monitoring stations had been monitoring particulate matter concentrations but lacked spatial information since there were only three stations. Due to this limitation, MODIS Aerosol Optical Depth data were used to interpolate and comprehensively estimate the missing values spatially. Iskandar Malaysia boundary falls within only ten out of sixteen grids of the aerosol optical depth (grid dimension: 0.2 degrees by 0.2 degrees). As shown in Figure 2, Terra Atmosphere Level 2 product data were used for this process. The separation between transboundary haze and local emissions were performed for the MODIS AOD data. Therefore, the transboundary pollution data during haze episodes were removed. The annual averages of PM₁₀ concentrations were then cross-selected with land use data. This process was done to accurately analyse the relationship. The selected annual average readings are for the years of 2002, 2006 and 2008. There were about thirty grids of annual average data available that could be analysed with the land use distribution data. In this study, the PM₁₀ readings were very important. However, the data derived from the MODIS AOD grid value was not particulate matter concentration. Therefore, a correlation between those monitoring data is also very essential to predict the PM₁₀ readings for other uncovered areas. A close relationship had been identified between the MODIS AOD grid value and the monitored PM₁₀ concentrations using mix effects model (Table 3).

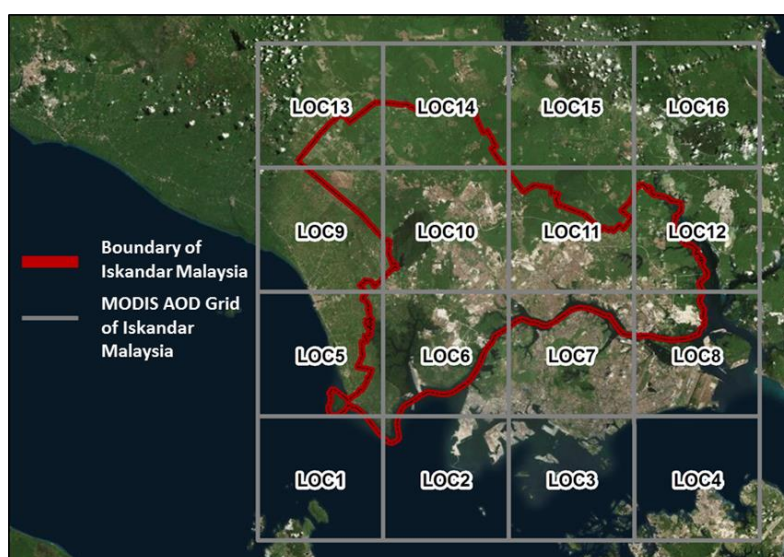


Figure 2: MODIS AOD grid of Iskandar Malaysia

Table 3: Calculated PM₁₀ value, predicted using MODIS AOD grid values

YEARS	LOCATION	MODIS AOD Grid Value(annual average)	Predicted PM ₁₀ Value(annual average)		
2002 $y = 0.0882x + 7.8111$	LOC5	Pulau Kukup	265.852116	31.25915667	
	LOC6	Gelang Patah & Nusajaya	291.023543	33.47927655	
	LOC7	Johor Bahru & Permas	375.798186	40.95640002	
	LOC8	Pasir Gudang	306.735493	34.86507056	
	LOC9	Tmn Putri, Kulai	264.577092	31.14669954	
	LOC10	Skudai & Senai	284.554563	32.9087125	
	LOC11	Ulu Tiram	287.461924	33.16514177	
	LOC12	Kg Delima, Pasir Gudang	280.480070	32.54934222	
	LOC13	Kg Sri Paya, Kulai	267.763567	31.42774664	
	LOC14	Sedenak	278.375440	32.36371389	
	2006 $y = 0.0496x + 29.843$	LOC5	Pulau Kukup	227.989497	41.15127903
		LOC6	Gelang Patah & Nusajaya	268.232292	43.14732166
		LOC7	Johor Bahru & Permas	286.768519	44.06671852
		LOC8	Pasir Gudang	293.092130	44.38036962
LOC9		Tmn Putri, Kulai	251.578150	42.32127623	
LOC10		Skudai & Senai	237.942550	41.64495046	
LOC11		Ulu Tiram	254.157788	42.44922628	
LOC12		Kg Delima, Pasir Gudang	247.558929	42.12192285	
LOC13		Kg Sri Paya, Kulai	253.300562	42.40670789	
LOC14		Sedenak	251.142598	42.29967287	
2008 $y = 0.0472x + 33.532$		LOC5	Pulau Kukup	296.384091	47.52132909
		LOC6	Gelang Patah & Nusajaya	407.743827	52.77750864
		LOC7	Johor Bahru & Permas	425.944444	53.63657778
		LOC8	Pasir Gudang	343.856790	49.7620405
	LOC9	Tmn Putri, Kulai	293.486688	47.38457169	
	LOC10	Skudai & Senai	351.439394	50.11993939	
	LOC11	Ulu Tiram	399.612500	52.39371	
	LOC12	Kg Delima, Pasir Gudang	352.167154	50.15428967	
	LOC13	Kg Sri Paya, Kulai	254.961689	45.56619176	
	LOC14	Sedenak	304.413874	47.90033487	

LANDSAT Thematic Mapper (1984-2008)

Monitoring land use changes in Iskandar Malaysia from the previous year was important in order to understand the impact of land use changes towards the anthropogenic impact during those periods. In order to analyse the changes, this research required several sets of satellite images to indicate the land cover of the selected years. The satellite images used in this research were obtained from LANDSAT Thematic Mapper (TM). The Landsat programme had introduced Thematic Mapper (TM) as an Earth observing sensor. This observing sensor was initially placed aboard Landsat 4 (decommissioned in 2001), then it had continued the operation aboard Landsat 5 for the recent years up to 2012. There were seven bands of image data featured in TM sensors, which had 30-metre spatial resolution (four in infrared and the other three in visible wavelengths). TM did not directly produce a thematic map, because it was functionally similar as the whisk broom scanner,

which took multi-spectral images across its ground track. Recently, Landsat 7 was used for the recent year's images and it was aboard with the Enhanced Thematic Mapper Plus (ETM+).

In order to measure the spread urbanisation in Iskandar Malaysia, LANDSAT TM satellite images were used to differentiate the built-up area from non-built-up area. This classification derived the increased built-up area as caused by urbanisation. Figure 3 shows the urbanisation progress of Iskandar Malaysia (1984 to 2008), which were processed from LANDSAT TM satellite images using supervised classification in ENVI software. According to the figure, the built-up area of Iskandar Malaysia had rapidly increased during 1990 to 1997, which evidently proved that Malaysia urbanised rapidly during the 90's, when government focused on the industrial sector; increase 5712.13 acres per year. The areas of built-up areas in Iskandar Malaysia started at 29,486.33 acres in 1984, and continuously increased to include a total area of 110,050.86 acres in 2008. The process itself provided many great opportunities in the economic sector, but was still a major contributor towards air pollution.

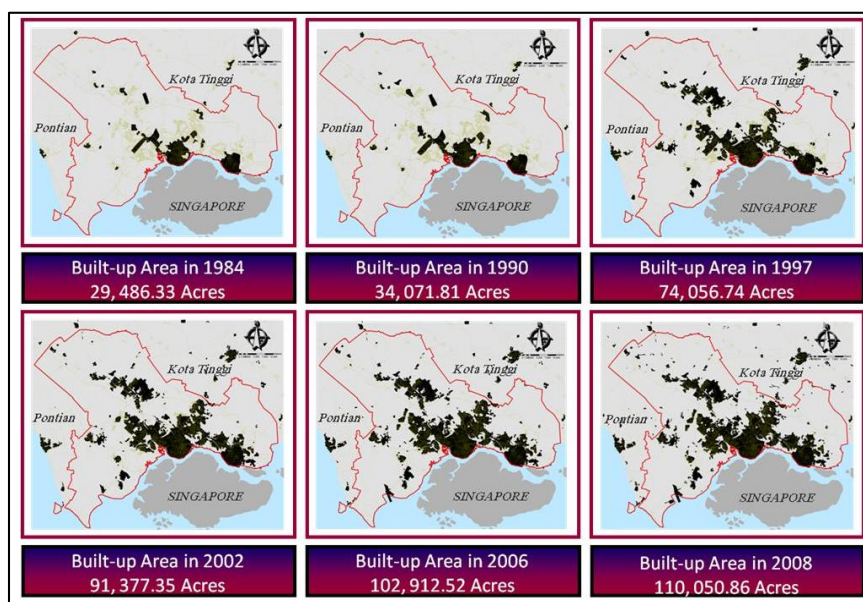


Figure 3: Urban expansion of Iskandar Malaysia, 1984-2008

According to the extracted urban land use of Iskandar Malaysia, the increasing acreage of built-up area had been of significance to particulate matter emissions. Therefore, a more detailed analysis of the built-up area was performed to analyse the effect of built-up area towards particulate matter emission. A cross-tabulation between built up area and the land use database was done to measure the land use changes periodically. Figure 4 shows land use change map of Iskandar Malaysia from the year of 1984 to 2008. According to the measured rates of land use change, the highest rate of change was observed between the year of 1990 and 1997; built-up area increase 5,712.13 acres per year. As a concern in this research, the land use changes were not an indicator

to prove that Malaysia was growing economically, but as an indicator of land use influence towards the degradation of air quality in Iskandar Malaysia.

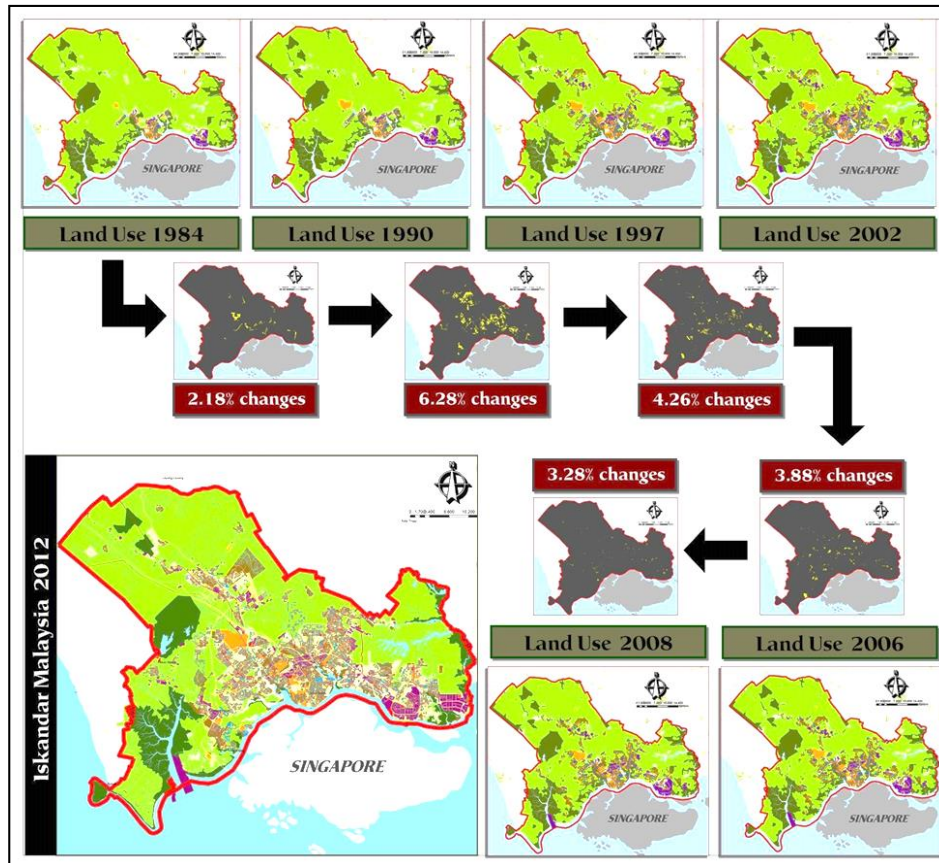


Figure 4: Map of land use changes in Iskandar Malaysia, 1984-2008

Extracted from the land use change map, the acreage of changes in Iskandar Malaysia was plotted in a graph (Figure 5). The processed data indicates that the major land use change was the change from agricultural activities to residential and industrial activities, with total acreage changes of 4937.17 acres/year and 1562.122 acres/year, respectively, for the whole period. Even though the highest change was from agricultural to residential, but still, the second highest changes were industrial activities. In addition, the figure showed that there were very low practices of brown field and infill development in Iskandar Malaysia, since the major change happened from agricultural and forest.

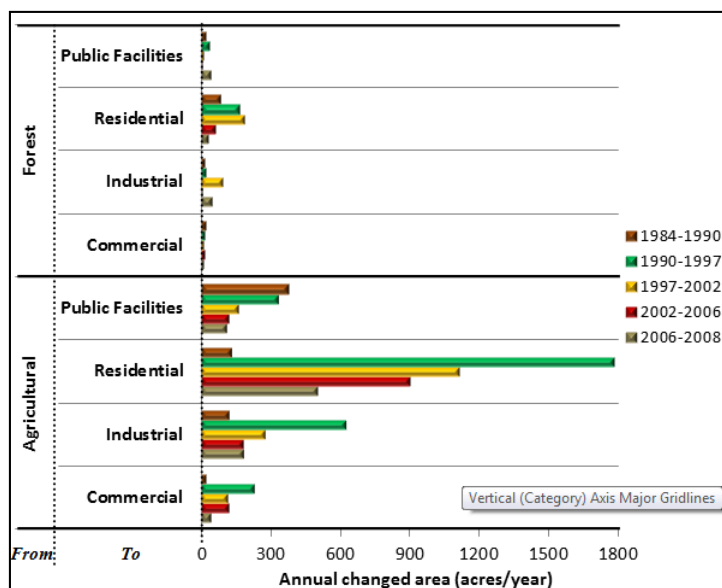


Figure 5: Land use changes process in Iskandar Malaysia, 1984-2008

ANALYSIS AND FINDINGS

A ternary or barycentric plot is a compositional graph that involves three axes bounded to each other which sum to a unity (Figure 6). It graphically illustrates the ratios of the three axes as positions in a triangle. Compositional data is usually plotted on this type of graph. This method is commonly used in physical mineralogy, petrology, metallurgy, chemistry and other physical sciences to show the compositions of systems consisting of three elements. In this research, the usage of this plot to study the relationship between land use composition and air pollutants seemed to be applicable. Fortunately, adding another perpendicular axis to this plot enabled us to identify the relationship between those compositional data with that perpendicular axis value. The derived perpendicular axis was adapted in this research to show the air pollutant concentrations, called a contour ternary plot. In order to determine the relationship surface, a kriging technique was used to interpolate the sample values.

Trying to read a ternary plot can be confusing because there are three axes bound to each other in order to plot compositional data. As shown in Figure 5.4, a ternary plot contains three main axes used to plot three types of elements in one composition. To use an example plotted by the red dot, this composition contained a ratio of 0.375:0.375:0.250 of elements A, B and C. Therefore, by understanding Figure 6, it is not very difficult to understand a ternary plot.

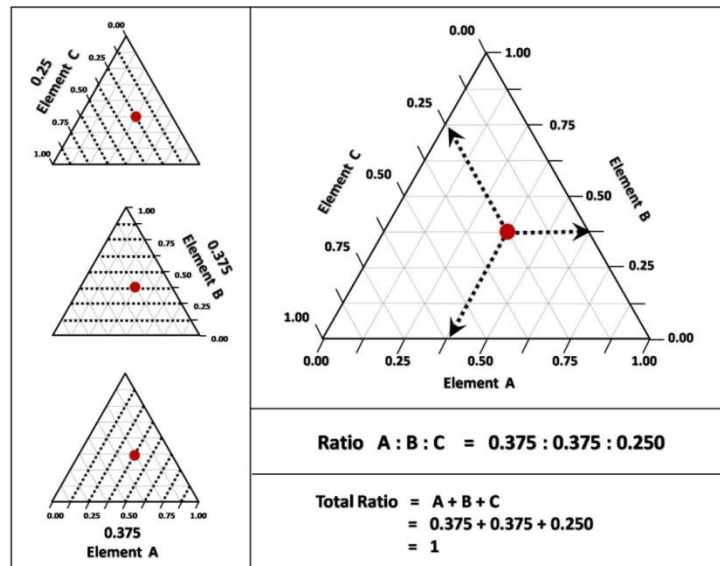


Figure 6: How to read a barycentric or ternary plot

Impact of Urban: Agriculture: Forest Land Use Composition on PM_{10}

Every land use composition involved in this research was plotted against the air pollutants. As the axes are limited to only three, several mix compositions had been considered to indicate the different land use scenarios. Figure 7 shows the pattern of PM_{10} for the composition of urban: agriculture: forest. The urban proportion made up the majority of urban land use in Iskandar Malaysia; consisting of industrial, residential, commercial and public facilities. It was found that these air pollutants had a different pattern. As shown in the figure, the main cause of increasing PM_{10} pollution was 'urban'. As the urban proportion increased, the annual average of PM_{10} concentration tended to increase. In general, this fact proved that urban activities were the main factor of PM_{10} local emissions in Iskandar Malaysia.

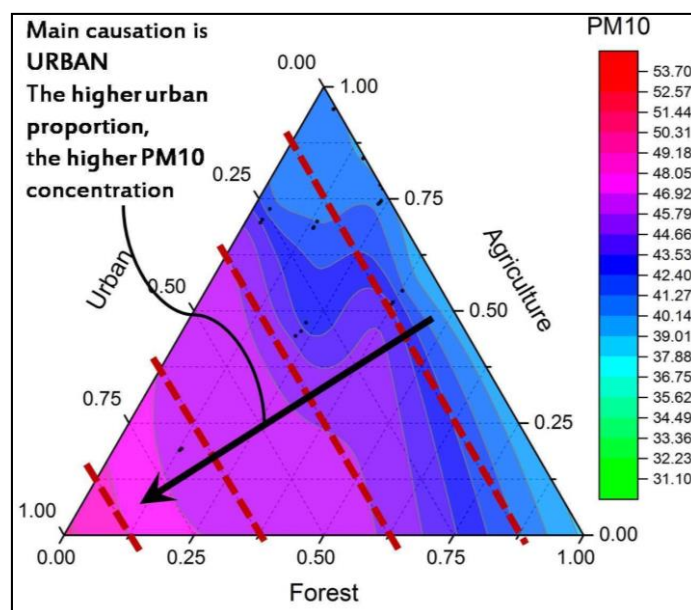


Figure 7: PM₁₀ pattern for urban: agriculture: forest land use composition in Iskandar Malaysia

Impact of Industry: Commercial: Residential Land Use Composition on PM₁₀

A more detailed analysis had been done to identify the land uses in urban area that contributed highly to the degrading of air quality. As shown in Figure 8, the pattern of PM₁₀ for the composition of the land use in Iskandar Malaysia's urban area clearly illustrated that the commercial sector was the main cause of the PM₁₀ annual average concentrations. As a matter of fact, if the commercial proportion increased, the PM₁₀ annual average concentration increased along. This was not as expected, because industrial activities are usually blamed as the main source of air pollutants. The collected data proved that the emissions from commercial activities were the main contributor to air pollution, followed by industrial activities. Upon closer observation, this scenario happens because the major contributor for PM₁₀ was transportation activities in commercial areas. Commercial areas in Iskandar Malaysia were smaller in size, but higher in transportation activities. The community in Iskandar Malaysia preferred to use private vehicles rather than walking or other green modes of transportation. This was supported by the fact that commercial areas usually attracted a large number of people, in addition to transportation activities that were not environment-friendly.

Yet another composition of urban: forest: agriculture was plotted. These compositions were plotted separately by each urban main land use types which are commercial, industry and residential (Figure 9). The results showed that all ternary contours have same pattern, but different magnitudes. As shown in Figure 9, the magnitude for commercial: forest: agriculture composition for PM₁₀ was found to be greater than other compositions. This figure supported and strengthened the results from

the previous ternary plot (Figure 8). Even though the commercial area had the highest contribution towards air pollutant emissions, industrial activities were not far behind commercial activities. Therefore, authorised parties should focus on controlling transportation in commercial and activities in industrial areas. As shown in Figure 9, the residential compositions presented the smallest influence towards the annual average concentration of those air pollutants. Even though residential compositions had the highest population, transportation activities were not as intense and concentrated as compared to commercial areas. This maybe the reason why the residential proportion had the smallest influence towards air pollutant emissions.

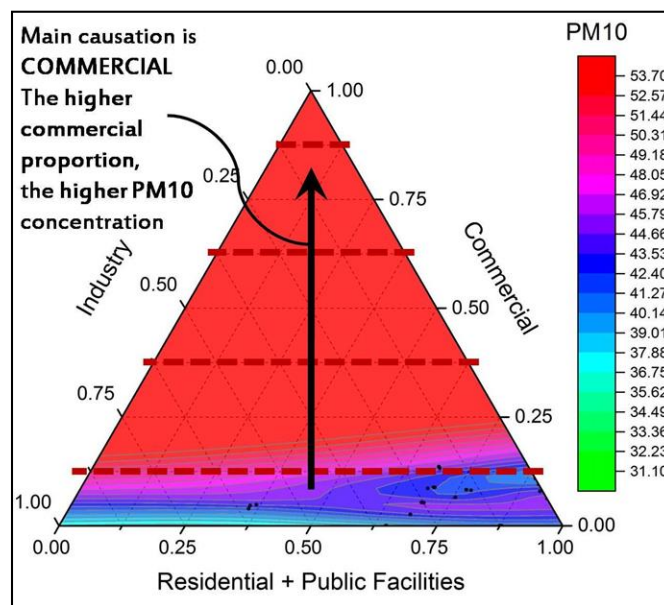


Figure 8: PM₁₀ pattern for industry: commercial: residential land use composition in Iskandar Malaysia

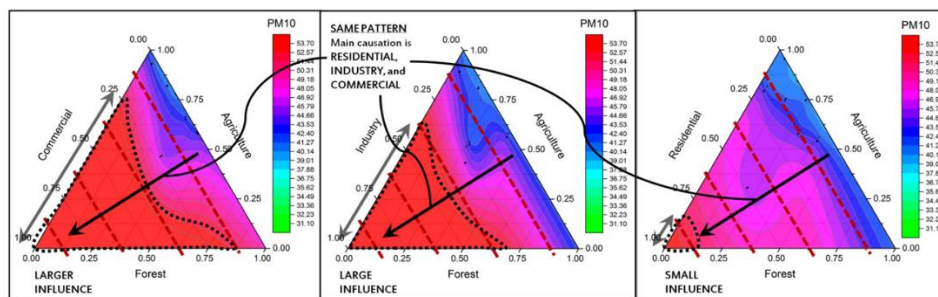


Figure 9: PM₁₀ pattern for urban type: agriculture: forest land use composition in Iskandar Malaysia.

CONCLUSION

The results shows that air quality as represented by PM₁₀ concentrations were inevitably linked to land use composition at the local level, notwithstanding the more noticeable but intermittent influence of the regional haze episodes. The degree of air pollution was noticeably controlled by the percentage of urban land use when compared to agriculture and forest, with PM₁₀ clearly affected by the size of commercial area, followed by industrial activities. The significant role of the commercial land use, even compared to industrial land use, is due to the pollution coming out from motored vehicles within the area. The use of ternary plots in explaining the relationship between land use composition and air pollution can definitely be extended in practice when deciding the balance between urban land use and other land uses or the balance between different components of urban land uses, i.e. residential, commercial and industrial. In addition to that, this study has also generated important findings on the relationship between land use changes and the local emission scenario in Iskandar Malaysia. Iskandar Malaysia, therefore, needs to be aware of the air pollution at its doorstep, while keeping an eye out for haze from neighbouring countries.

ACKNOWLEDGMENT

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MONITORING THE PERFORMANCE OF STATE STRUCTURE PLAN IN DELIVERING OUTPUT USING DYNAMIC MODEL

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Abstract

Plan outputs are the material objects that are tangible and provided as a result of the implementation of a development plan. They often act as precursor to achieving plan outcomes. Therefore, it is important to monitor the performance of plan in delivering its outputs so that the prospect of achieving its outcomes remains high. However, present state structure plan monitoring programmes focus mostly on monitoring land use change and not plan output delivery. The absence of output monitoring reduces the usefulness of the programmes and contributes to under-provision of outputs, especially public facilities and open spaces. This study proposes that state structure plan monitoring programmes must include mechanism to monitor the performance of the plan in delivering plan outputs. To this end, a dynamic model for monitoring performance of state structure plan in delivering open spaces was developed using STELLA software and applied on the Selangor State Structure Plan. The model simulation showed that the Selangor State Structure Plan has performed poorly in delivering the open spaces where their provision has not conform to the plan's targets. The model simulations also show that this non-conformances will remain by the end of the plan's planning period.

Keyword: plan monitoring, plan performance, dynamic model

INTRODUCTION

Talen (1997) bemoans the fact that development plan success (or failure) is increasingly being measured against factors that are detached from the traditional role of planning in the built-environment. She argues that the focus of built-environment is largely object-oriented. Thus, the core of planning function is to effect object-oriented changes in the built-environment. And since planners use development plan to guide them in their efforts to implement those changes, she opines that plan success must also be viewed in terms of its performance in effecting those changes.

In the meantime, Faludi (2000) categorises changes resulting from plan implementation into two, which are plan outputs and plan outcomes. Plan outputs are the material objects that are tangible and provided as a result of the implementation of a development plan. These, for instance, include schools, open spaces, houses, hospitals, roads and transport terminals. Calkins (1979), in the meantime, calls these plan outputs as the measurable attributes of the plan. The opposite of plan outputs are plan outcomes,

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which are the intangible results of development plan implementation such as improved environmental quality, safer living environment and reduced illiteracy rate.

Going by Talen's suggestion that the core of planning is to effect object-oriented change, and Faludi's categorisation of plan output and outcome, it is clear that among the main functions of development plan is to deliver outputs. In most instances, development plan's policies include the need to deliver plan outputs. These policies must be acted upon if outcomes are to be achieved (Barret, 2004; Davidson, 2000). This is because, outputs are precursors to outcomes (Vedung, 1997). For instance, in an attempt to reduce illiteracy rate (outcome), it is necessary that sufficient number of schools (output) are firstly provided so that education can be easily accessed by the population. Inability of development plan to provide outputs as intended will jeopardise the success of the plan in realising its outcomes. Thus, it is important that development plan performance in delivering those outputs must be monitored and, if necessary, improved so that the plan can succeed.

PLAN OUTPUT MONITORING

The amount of any given output that a plan needs to deliver is projected during the plan's preparation phase. The projection may be based on a number of assumptions, but most commonly it is based on population projection (Leung, 2003). Plan outputs are typically described in terms of unit and time (Faludi, 2000; Seasons, 2003), such as the number of houses to be built within five years, or the number of open space required within the next ten years. Calkins (1979) calls this as the plan's end-state targets.

While the number of output required is determined during plan preparation, the actual delivery of the output occurs during the plan's implementation phase. However, development plans are usually long-term plans with long implementation period. For instance, in Malaysia, the implementation period of state structure plans (SSP) ranges from fifteen to twenty years. Therefore, throughout the long implementation period, the number of output required as initially projected during plan preparation may no longer be applicable. As plan is being implemented, the number of output required may increase or decrease, depending on the number of population of the planned area. Thus, the number of output required must be regularly monitored and revised based on the number of population so that the planning authorities would know exactly how many of the plan outputs that they need to provide in order to cater the demand of the community sufficiently.

Plan output is monitored based on the conformance of its changes on the ground to its end-state target, or the plan's stated intention (Barret & Fudge, 1981; Mastop & Faludi, 1997; Talen, 1997). This means that if the actual output change on the ground is in concurrence with the plan's initial projection, the output is said to be in conformance to the plan. Otherwise, the output is considered to be non-conformance to the plan.

Monitoring the conformance of output is not about assessing the success or failure of a plan (Berke et al., 2006). Instead, it should be viewed as opportunity to improve performance of plan in delivering output (Ortolano & Perman, 1990). Regular monitoring would inform the planning authorities of the state of the plan's performance in terms of output delivery. This would allow the authorities to correct any under- or over-achievement of the targets.

Despite its importance, prior studies related to monitoring of plan output conformance is limited. Although some scholars do investigate plan conformance, these are centred on outcome conformance (or more specifically on land use change) rather than output conformance (Ahmad Nazri Muhamad Ludin, Mohd Nuruddin Abdul Kadir, & Susilawati Sulaiman, 2009; Alterman, Carmon, & Hill, 1984; Chapin, Deyle, & Baker, 2008; Combe, 2008; Hao, Sliuzas, Zhan, & Geertman, 2009; Laurian et al., 2010; Tarmiji Masron & Ruslan Rainis, 2004). Except for Calkins (1979), who proposes a 'planning monitor' to measure plan output conformance. He suggests that, by using the planning monitor, performance of plan can be measured based on conformance of actual output change to end-state target. This is done by measuring the rate of increase in output change at the time of measurement against the target.

Nevertheless, Calkins' planning monitor measures output conformance to static end-state target. Whereas, we suggest that plan output monitoring must be more dynamic. Since output requirement is based on population, the end-state target may not be appropriate anymore if there are changes to the population number. Thus, output monitoring mechanism must be able to inform of any changes in population number as well as the actual output required based on the changes in the population number. To this end, we propose that a dynamic model is developed to monitor the output delivery of development plan.

DYNAMIC MODEL

Dynamic model, also sometimes referred to as 'system-dynamic model', is a modelling method that stemmed from system dynamics thinking (Forrester, 1970; Guhathakurta, 2002). A dynamic model is basically a mathematical model that exploits mathematical functions and uses 'if-then' rules to represent and simulate a system (Ford, 1999; Ortolano & Perman, 1990). Dynamic model is often used to replicate and to simulate a system with the purpose of understanding how the system works, and to use this understanding to explain what has happened and to project what will happen next, with a view to improve the system (Saeed, 2002; Santos, Belton, & Howick, 2002).

Extensive literature review does not reveal any prior study that experiments with the application of dynamic model in monitoring plan output conformance. However, dynamic model itself is not alien to planning researches. Previous studies related to dynamic model application in the planning field are largely concerned on the application of the model in the planning and management of the environment, and in evaluating the impacts of planning policies (Deal & Schunk, 2004; Guo et al., 2001; Han, Hayashi, Cao, & Imura, 2009; Simmonds, 1999). This is most likely due to the fact that dynamic model does not handle spatial analysis well (Guo et al., 2001; Han et al., 2009), especially when most planners seem to believe that spatial analysis is the main important analysis in planning context.

STATE STRUCTURE PLAN MONITORING IN MALAYSIA

Development plan monitoring in Malaysia is mostly characterised by two main features. Firstly, plan implementation is rarely monitored and, secondly, existing plan monitoring programmes are heavily focused on measuring land use change and not output delivery. Presently, despite the high number of development plans in effect in Malaysia, only a small fraction of these plans is being monitored in terms of their implementation

(Muhammad Faris Abdullah, Alias Abdullah, & Rustam Khairi Zahari, 2009, 2010). Similarly, only a handful of local scholars have undertaken researches into plan monitoring (Ahmad Nazri Muhamad Ludin et al., 2009; Ahris Yaakup, 2004; Tarmiji Masron, 2003; Tarmiji Masron & Ruslan Rainis, 2004).

Inadequate emphasis on monitoring of development plan is not limited to Malaysia only. Planning scholars have observed that, over the years, planning research and practice the world over have largely been centred around plan preparation, such as refining plan preparation process, and improving methods and techniques of plan-making. Meanwhile, few researches and practices deal with plan implementation and monitoring (Berke et al., 2006; Laurian et al., 2010; Seasons, 2003; Talen, 1997). Even in countries where plan monitoring is mandatory, such as in the United Kingdom, plan monitoring remains scarce (Carmona & Sieh, 2008).

In terms of state structure plan (SSP) monitoring in Malaysia, presently only three are being monitored. These are the Negeri Sembilan SSP, the Melaka SSP and the Terengganu SSP. In Negeri Sembilan, the State Department of Town and Country Planning (DTCP) employs a purposely-developed GIS-based system to monitor the implementation of its SSP (Ahris Yaakup, Siti Zalina Abu Bakar, & Susilawati Sulaiman, 2009). The system, which is also known as GIS9, monitors actual changes in land use within the state and compares them to the land use allocation as proposed by the Negeri Sembilan SSP (UGisP, 2006). In Melaka, the State DTCP monitors land use changes using GIS-based charting system (Zainuddin Ahamad, personal communication, 7 November 2008). The charting system refers to the use of GIS software, in this case MapInfo, to map and to calculate the existing land use coverage of the state, which is then compared manually with the land use allocation as proposed by the Melaka SSP. In Terengganu, SSP monitoring relies on meetings and paper-and-pen approach (Nik Husni Nik Rashid, personal communication, 30 June 2008). Several meetings were held where representatives from all agencies involved in the implementation of the Terengganu SSP were invited to participate. Paper forms, which listed all the projects proposed by the SSP, were distributed to the representatives during the meeting. They were then asked to fill in the forms with the existing status of the projects implementation. Percentages were used to indicate how far a project has been implemented. A report was then prepared.

As can be seen above, all of the SSP monitoring focuses on land use change, and not plan outputs. While the monitoring of land use change may be of interest to the State DTCP, it may not be as useful to the other implementing agencies. These includes the various technical agencies whose roles in SSP implementation are mainly to provide the outputs that have been identified as required by the SSP such as houses, hospitals, schools, open spaces, and so on (Ahmad Nazri Muhamad Ludin et al., 2009). What is more important to them in terms of SSP monitoring would be information feedback such as the number of facilities already being provided and how many more of these facilities need to be provided (Muhammad Faris Abdullah et al., 2009).

STATE STRUCTURE PLAN AND OPEN SPACE PROVISION

Open space is defined by the Malaysian Town and Country Planning Act 1976 (Act 172) as “any land whether enclosed or not which is laid out or reserved for laying out wholly or partly as a public garden, park, sports and recreation ground, pleasure ground, walk or as a public space”. Open space contributes greatly towards improved environmental

quality as well as quality of life. Therefore, it is important that open spaces are being provided sufficiently to meet the needs of the community and also to attain high quality environment.

Despite its importance, open space is commonly under-provided in Malaysia. This is demonstrated in Table 1 below where the amount of open space land provided in the states of Selangor, Perak and Pahang, at the beginning of the states' SSP period, was well below the amount required. Under-provision of open space land is the highest in Perak where 81% of the required open space land was not provided.

Table 1: Status of Open Space Provision in Selected States at the Beginning of Their SSP Period

State	Existing (ha)	Required (ha)	% difference
Selangor	9,651	14,242	32%
Perak	1,314	7,002	81%
Pahang	1,758	4,380	60%

Source: Jabatan Perancangan Bandar dan Desa Negeri Selangor (2007), Jabatan Perancangan Bandar dan Desa Perak Darul Ridzuan (2008), Kerajaan Negeri Pahang Darul Makmur (2008).

Identifying and analysing the needs for open space are among the important functions of a development plan. For instance, the Town and Country Planning Act 1976 states that, among others, "...development plans shall formulate and propose measures to improve physical living environment and social well-being, as well as the making up of open spaces." Thus, during SSP preparation, the number of open space that the SSP need to deliver was projected using population as its basis. The population thresholds for open space projection are predetermined in the planning guidelines published by the Federal DTCP (Jabatan Perancangan Bandar dan Desa Semenanjung Malaysia, 2005). These thresholds are as listed in Table 2 below.

Table 2: Population Thresholds and Minimum Land Size Requirements for Open Space

Type	Population threshold (person)	Minimum land size requirement (ha)
Urban park	50,000	40.0
Local park	50,000	8.0
Neighbourhood park	12,000	2.0
Play park	3,000	0.6
Play lot	1,000	0.2

Source: Jabatan Perancangan Bandar dan Desa Semenanjung Malaysia (2005)

DYNAMIC SSP OUTPUT MONITORING MODEL

For the purpose of investigating the applicability of using dynamic model to monitor SSP performance in delivering its outputs, we developed a dynamic monitoring model to measure open space conformance of the Selangor State Structure Plan. The model is as shown in Figure 1 below. The model was developed using STELLA (v9) software.

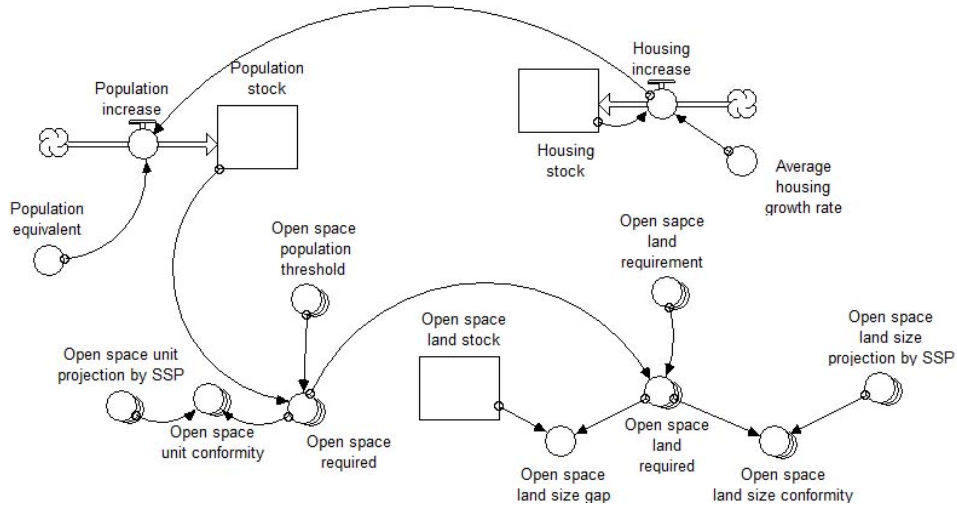


Figure 1: Dynamic SSP Output Monitoring Model

Two types of conformance analyses are proposed in the model, which are ‘conformity analysis and ‘gap analysis’. The former is about determining whether the Selangor SSP open space target will be met by the end of the plan’s planning period and the latter to determine whether the number of output change meet demand based on the population number. Conformity analysis would help planning authority to assess the effectiveness of the plan’s end-state target and to establish new target if necessary. Gap analysis would help planning authority to understand the current state of output provision and to identify any shortage or surplus of the output.

For the purpose of conformity analysis, the following is observed:

$$C = \beta_R - \beta_X \quad (1)$$

where output conformance (C) is the difference between the number of output required (β_R) and the plan’s output target (β_X). Full conformance occurs when C is equal to zero. A negative C means the plan’s target is greater than the number of output required and indicative of under-conformance. Meanwhile, a positive C means that the number of output required exceeds the plan’s target, indicating over-conformance.

Meanwhile, gap analysis observes the following equation:

$$G = \beta - \beta_R \quad (2)$$

where output gap (G) is the difference between the output existing stock (β) and the number of output required (β_R). A positive G means that output existing stock is greater than the number of output required. A positive G also indicates that the demand is less than the number of output provided, thus, creating output surplus. On the other hand, a negative G means that output stock is less than what is required, hence, resulting in output shortage. If G is equal to zero, then output stock is equal to the number of output required.

To determine the gap and the number of output required in the future, the model needs existing population data and it must be able to project population number into the

future. However, existing population data is difficult to come by. In Malaysia, the national population census, which is often regarded as the main source of actual population data, is only conducted once in every ten years. In between the censuses, planners have to rely on estimations in order to determine the existing population number of a planned area. Therefore, the model uses proxy data, in the form of housing, to determine population number. In Malaysia, housing development requires planning permission. Thus, housing data for a planned area is easier to collate and update since planning authorities keep records of all planning permission granted. The Malaysian National Property Information Centre also records and updates housing data for all states in Malaysia. It also publishes the housing data through its property market reports. Other data required by the model are collected also from secondary sources. Table 3 below details out the types of data gathered and their sources.

Table 3: Data Types and Data Sources

Data	Sources		
	Baseline	Present	Target
Population	Selangor SSP	-	Selangor SSP
Housing	Selangor SSP	NAPIC	Selangor SSP
Schools	Selangor SSP	DEGIS	Selangor SSP
Open spaces	Selangor SSP	DEGIS	Selangor SSP

As can be seen in Table 3, all baseline and target data are sourced from the Selangor SSP itself. Meanwhile, present data for housing is sourced from the property market reports published by the National Property Information Centre of the Ministry of Finance (NAPIC), Malaysia. Present data (existing stock) of open space are sourced from the Darul Ehsan GIS (DEGIS) database. The base year and the target data is needed for the purpose of calibrating the model so that it can replicate the output projection method as employed by the SSP. Meanwhile, the present data are needed so that the model can run simulations in order to analyse the conformance and gap of the open space delivery. Present data are from year 2010.

It has to be noted here that present data for open space obtained is incomplete in the sense that not all existing open space in Selangor is identified by type. As such, gap analysis for open space cannot be undertaken.

ANALYSIS AND FINDINGS

The model is set to run simulation from year 2000 until year 2020, which is the planning period of the Selangor SSP. The model is also set to display simulation results at every five-year intervals throughout the simulation period. The results of the simulation are as follow.

Open Space Projection

Table 4 below shows the number of open space required for the State of Selangor as projected by the model.

Table 4: Selangor Open Space Required Projection

Type	Year				
	2000 (nos.)	2005 (nos.)	2010 (nos.)	2015 (nos.)	2020 (nos.)
Urban park	84	102	121	140	158
Local park	84	102	121	140	158
Neighbourhood park	349	427	504	582	660
Play park	1,396	1,707	2,018	2,328	2,639
Play lot	4,189	5,121	6,053	6,984	7,916

The results in Table 4 show that the total number required for each type of open space is projected to increase throughout the simulation period. In the case of urban park and local park, their projected number is similar to one another. This is because of their requirement is based on similar population threshold, which is 50,000 people (refer Table 2). Thus, it can be seen from Table 4 that the present number of urban park required is projected by the model at 121 units, which is similar to the number of local park required. In the meantime, the total number required for neighbourhood park, play park and play lot at present are 504 units, 2,018 units and 6,053 units, accordingly. By the end of the Selangor SSP planning period, the number of open spaces required are projected to increase to 158 unit for urban and local parks, 660 units for neighbourhood park, 2,639 units for play park and 7,916 units for play lot.

Figure 2 and Figure 3 below compare the number of open space required as projected by the model against the Selangor SSP open space projections. Both Figure 2 and Figure 3 show that throughout the simulation period, the model projections for all types of open space are always higher than the Selangor SSP projections. The biggest non-conformance occurred at the beginning of the simulation period, which was year 2000. This is because the model projections for year 2000 were based on the actual population in that year, while the SSP projections for year 2000 were based on the actual open space stock in that year. Therefore, since the model open space projections for year 2000 were higher than the SSP open space projections for that same year, this means that the State of Selangor was already facing shortage of open space at the beginning of the SSP planning period. Moreover, the big gap between the model projections and the SSP projections for year 2000 also indicates that not only there was shortage of open space in that year, but the shortage was also large.

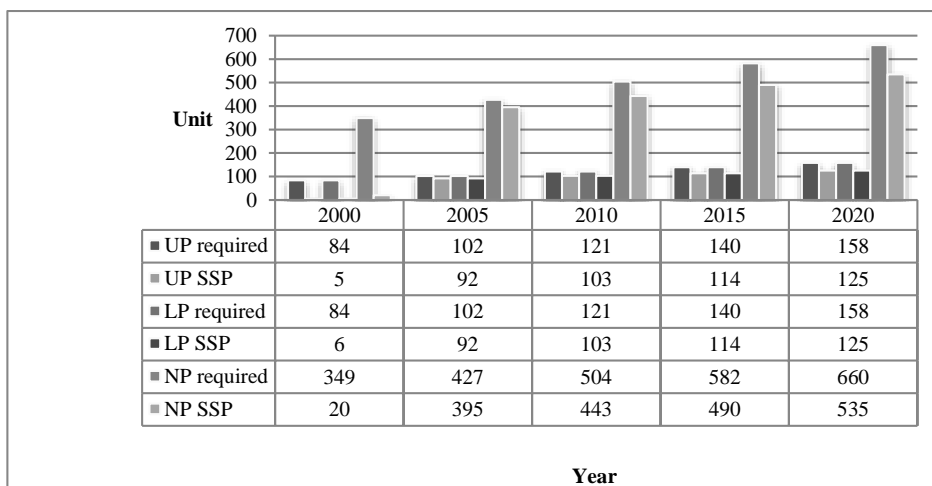


Figure 2: Selangor Open Space Required against SSP Projection: Urban Park, Local Park and Neighbourhood Park

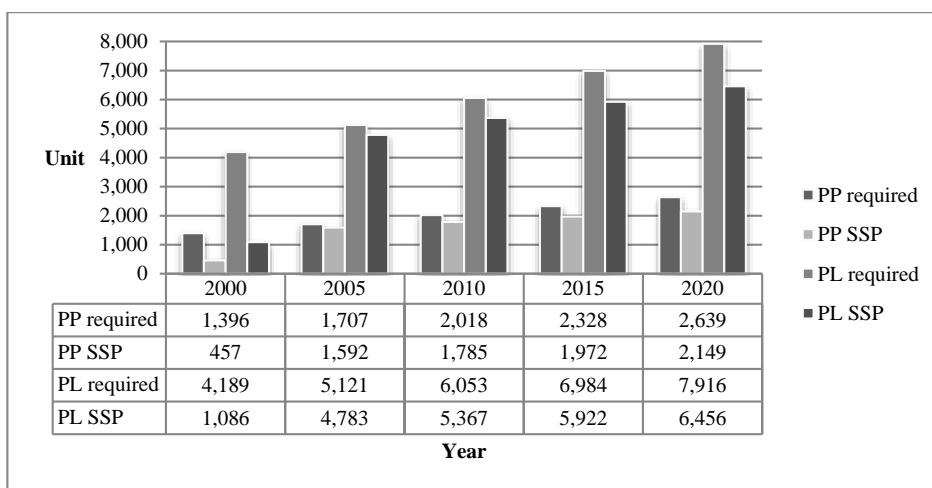


Figure 3: Selangor Open Space Required against SSP Projection: Play Park and Play Lot

Open Space Conformity

Table 5 below shows the results for open space conformity for Selangor SSP. The results point to an obvious pattern where the conformity for all types of open space are in the negative initially, but become positive by year 2015. This means that initially, for each type of open space, the total number required is still less than the Selangor SSP year 2020 target (end-state target). However, by year 2015, the number required will already exceed the target. By year 2020, the conformity for all types of open space will continue to be in the positive, indicating over-conformance. For urban park and local park, their total

conformity by year 2020 will be at 33 units. Meanwhile for neighbourhood park, play park and play lot, their corresponding conformity will be at 125 units, 490 units and 1,460 units.

Table 5: Selangor Open Space Conformity

Type	Year				
	2000 (nos.)	2005 (nos.)	2010 (nos.)	2015 (nos.)	2020 (nos.)
Urban park	-41	-23	-4	15	33
Local park	-41	-23	-4	15	33
Neighbourhood park	-186	-108	-31	47	125
Play park	-753	-442	-131	179	490
Play lot	-2,267	-1335	-403	528	1,460

Open Space Land Projection

Table 6 below displays the total amount of open space land required as projected by the model, as well as the amount of open space land as projected by the Selangor SSP. From Table 6, it can be seen that throughout the simulation period, the total amount of open space land required keeps on increasing during the simulation period. By the end of the simulation period, the amount is projected to increase to 12,085.54 hectares. At any given year, the model projection for open space land required is always higher than that of the Selangor SSP.

Table 6: Selangor Open Space Land Projection

Projection type	Year				
	2000 (ha)	2005 (ha)	2010 (ha)	2015 (ha)	2020 (ha)
Model projection	6,395.02	7,817.65	9,240.28	10,662.91	12,085.54
Selangor SSP projection	1,129.96	7,117.80	7,974.40	8,819.60	9,650.60

Open Space Land Conformity

The results for open space land conformity are shown in Figure 4 below. From the figure, it can be seen that up until year 2010, the total open space land size conformity is measured at -410.32 hectares. The negative conformity indicates that presently the total amount of open space land required is still below the Selangor SSP end-state target. However, by year 2015, the amount of open space land required is projected to already exceed the Selangor SSP target by 1,012 hectares, indicating over-conformance. By year 2020, the excess is projected to be even bigger at 2,434 hectares. This indicates over-conformance of open space land requirement will continue until the end of the Selangor SSP planning period.

The result of conformity analysis shown in Figure 4 also reveals that the biggest non-conformance (-3,255 hectares) occurred at the beginning of the Selangor SSP planning period, which was year 2000. This means that there was already a large shortage of open space land in Selangor in that year. This is consistent with the findings previously shown in Figure 2 and Figure 3 above.

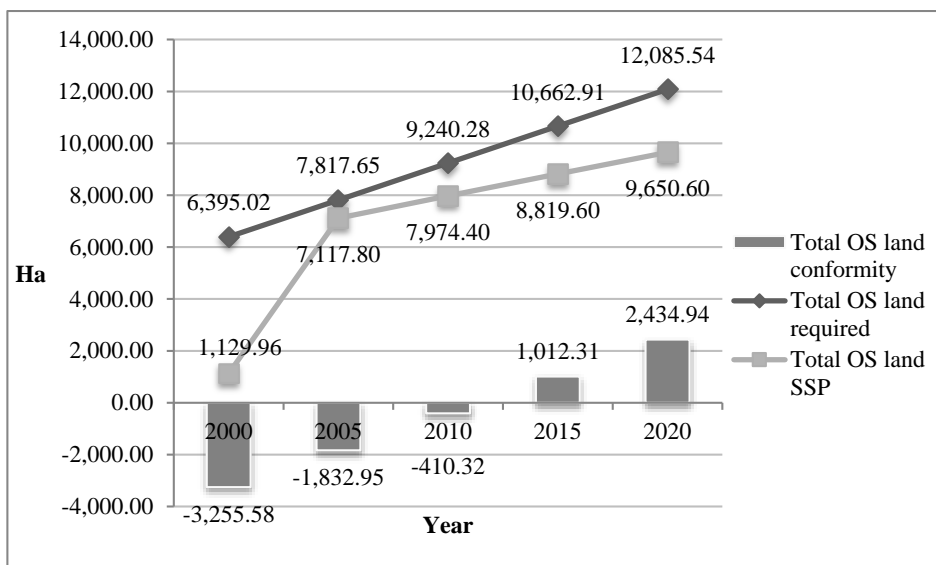


Figure 4: Selangor Open Space Land Conformity

Open Space Land Gap

Figure 5 below plots the results for total open space land gap analysis for Selangor. The figure shows that the existing open space land stock in year 2010 stands at 2,388.71 hectares. Meanwhile, the total open space land required as projected by the model for that same year stands at 9,240.28 hectares. These inevitably resulted in a negative land size gap, which is measured at -6,851.57 hectares. This negative land size gap signifies that the present land stock is unable to meet the present demand, and hence, there is a shortage of open space land in the State of Selangor.

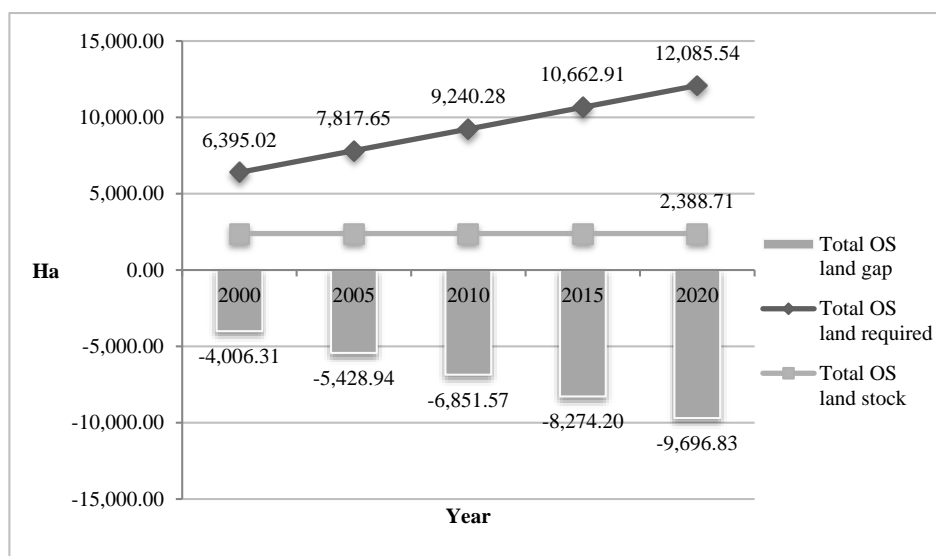


Figure 5: Selangor Open Space Land Gap

In fact, Figure 5 shows that negative land size gap is not restricted only to year 2010, but is common throughout the simulation period. For instance, the land size gap for year 2000 was -4,006.31 hectares, and by year 2015, the gap is projected at -8,274.20 hectares. Eventually, by year 2020, the gap is expected to worsen at -9,696.83 hectares. The negative land size gap throughout the simulation period means that the present total open space land stock is very small that it would not meet the amount of land required at any point during the simulation period. The present open space land stock could not even meet the demand in year 2000, and it certainly would not meet the demand by year 2020. This further corroborates the earlier finding that, even at the beginning of the planned period, there was already a large shortage of open space land in Selangor. Moreover, if the present land stock remained, the shortage will only get bigger by year 2020.

The status of total open space provision can be further assessed by comparing the increase in total open space land stock against the increase in total open space land required. The increase the land stock between year 2000 until year 2010 is represented by the difference between the initial SSP projection and the year 2010 stock. Thus, from Figure 6 below, it can be seen that the SSP projection for year 2000 was 1,129.96 hectares, while the existing year 2010 land stock is 2,388.71 hectares. These give a difference of 1,258.75 hectares, which is the actual increase of open space land stock within the period of year 2000 until 2010.

In the meantime, Figure 5.53 also shows that within that same ten year period, the total open space land required as projected by the model has increased from 6,395.02 hectares in year 2000 to 9,420.28 hectares in year 2010. These give a net increase of 2,845.26 hectares. This increase is higher than the increase in total open space land stock by 1,586.51 hectares. This means that, during the period, the increase in open space land stock has not been able to match the increase in open space land required, and hence, created 'new' shortage of open space land in Selangor.

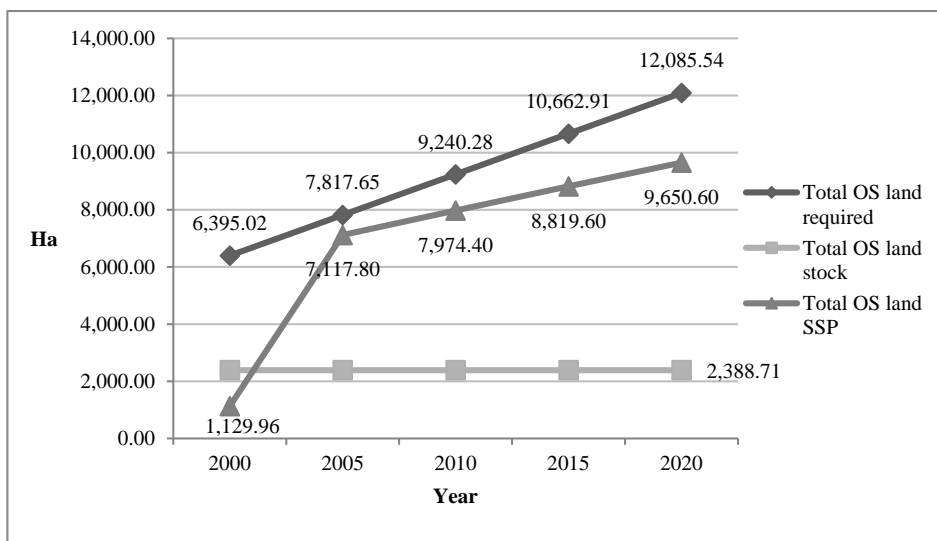


Figure 6: Comparison between Total Open Space Land Required, Stock and Targets

To be exact, during the period of year 2000 until 2010, the newly created open space land shortage for Selangor was 1,586.51 hectares. The state was already experiencing severe open space land shortage in year 2000. Now, with the addition of the new shortage on top of the initial one, the state is undoubtedly experiencing a much severe shortage of open space land presently than it did in year 2000.

DISCUSSION AND RECOMMENDATIONS

The simulation results show positive conformity for both open space required and open space land required by the end of the simulation period. This means that by year 2020 the number required for all types of open space, and the amount of land they require, will be higher than the targets set by the Selangor SSP. These indicate over-conformance. As such, in order to achieve 100% conformance, it may be necessary for the Selangor State DTCP to review the Selangor SSP open space end-state targets to follow the model projections. Otherwise, the authority may retain the SSP targets but must introduce corrective actions so that 100% conformance can be achieved by the end of the Selangor SSP planning period.

The simulation results also show that the State of Selangor was already facing shortage of open space, both in terms of unit and land, in year 2000. The open space land gap analysis shows that the shortage of open space land in Selangor is now bigger than it was in year 2000. This is due to the fact that between year 2000 until 2010, the increase in open space land stock has not matched the increase in open space land required for that same period, thus creating a 'new' shortage. This new shortage, when added on top of the initial shortage, makes for a bigger open space land shortage in Selangor. Thus, the State DTCP should give more attention towards the provision of open space in the future and try to close the gap between the amount of open space land provided and the amount required.

CONCLUSION

This study has shown that dynamic model can be used successfully to monitor the performance of SSP in delivering its outputs. Its application on the Selangor SSP shows that the SSP has performed rather poorly in terms of its open space output delivery. However, as mentioned earlier, this should not be taken as indication that the plan has failed. Rather, the information feedbacks resulting from the model application should be used to help the Selangor State DTCP in improving the performance of the SSP.

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